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Agra, Delhi, and Lahore.

So much has been recently written, so many sketches, prints, and photographs have lately been made, of the great cities of Mogul sovereignty and fame, that we may well apologise for attempting to prolong an interest in India with reminiscences of a spot of earth, certainly less known, and perhaps more valuable and interesting, to the practical architect than any other region, except Greece and just a corner or two of Western Europe. The descriptions given of Mogul Capitals by early and rare travellers founded the well-worn and sometimes derided faith of the West in the splendour and magnificence of the "gorgeous East." Yet the three cities, the names of which we have linked, are even now little known even to the majority of those whose youth and prime are being expended in India; and they are totally ignored, except by an infinitesimally small number, by those who have never crossed to the eastern side of the Indus. These cities are now lying open to any diligent book-maker who is competent to read what scattered monuments of architecture are able to tell; and although the traditions of true construction are said to be now understood by all and practised by none in Europe, within and around Agra, Delhi, and Lahore, there are still rising tombs and palaces constructed upon something of the principle, or rather absence of affectation, which distinguishes the best temples and cathedrals of classical and mediæval Europe.

But if individual cities in India are actually waiting for a bookmaker, what may not be the reward of him who shall write a popular treatise or handy-book upon Indian geography?—not only for the use of those who travel by land and by water, but also for that large section of the English community which stays at home or at most ventures to cross the Seine or paddle upon the Rhine. Before people can safely be taught the Indian method of combining white marble, red sandstone, and Persian tiles, perhaps a knowledge concerning the position of the divers centres of art and industry, the names of which they are to read, might be advantageously acquired. Thirty-six years ago, Macaulay, in his essay on Lord Clive, maintained that hardly one cultivated man in ten could tell "whether Sujah Dowlah ruled in Oude or in Travancore, or whether Holkar was a Hindoo or a Mussulman"; and at the present hour a person bound for Allahábád, viâ Suez and Bombay, is not unfrequently asked by pertinacious friends to leave a parcel with a missionary in Mysore, or to call upon a doctor at Darjeeling. The deplorable disregard for exactness—not to say ignorance—shown by educated Englishmen as to what is comprised under the head of Bengal, or similar geographical distinctions of political or other origin in India, is only equalled by the admitted incapacity of Parisians to understand the language and locality of any city but their own. At the same time this absence of knowledge lends something of mystery and romance to the subject. To hear, correctly enough, that Mr. Fergusson journeyed upon the back of a camel while collecting notes for his famous books about Indian architecture, increases the interest which they afford. To imagine, not unnaturally, from the surfeit of elephants with which artist-correspondents in the jungle have lately favoured the British public, that those quadrupeds are constantly passed and repassed upon every trunk road, and at every turn of a high street, is, of course, eminently attractive. But depressing as the truth frequently is, it is an absolute duty to say that the great Indian routes, especially those of the North-west Provinces, are now prosaic thoroughfares, on which may be encountered some of the comforts, and few of the discomforts of modern travel. There is really no reason why, during the winter months, English gentlemen and ladies should not see the new world of an old civilisation. It would not cost very much more than shutting themselves up, as they often do, in Nice and Hyères. After three short sea-passages they can land at Bombay, to find hotels, quite as good as any French ones out of Paris, and society far better than that usually encountered at a Mediterranean sanatorium. The plains of Delhi, seen from the summit of the Kútab-Minar, are necessarily a more impressive sight than that vast expanse of nothingness to enjoy which travellers flock to Cairo and climb the Great Pyramid. Although Bombay and Calcutta are more than 1,400 miles apart, travelling between them in winter is by no means hard work, at least to a tourist; and although Delhi is 1,235 miles by rail from Bombay, and 955 from Calcutta, the three Mogul cities are comparatively close together. Agra and Lahore are nearer to each other than London and Edinburgh; and Agra and Delhi are only separated by a distance of 127 miles. You may take your railway ticket at any of these places with far greater ease than is possible in England or France; and, in so doing, you will be treated with respectful consideration, singularly different from the good-natured roughness of the one and the polished incivility of the other. You will travel in carriages as roomy and comfortable as those on the great lines of Europe are crowded and confined; and in the city of Sháh-Jehán your address, if you so choose, may be St. James's-place, near St. James's Church, Delhi!

Much as the Anglo-Saxon tourist has been reviled by smart writers for eccentricity in sight-seeing, it is he, nevertheless, who has helped to make archæology popular, by "doing" the principal historical buildings of Europe; and until the plains of Delhi are systematically "done," the best examples extant of Patán and Mogul architecture will not be permanently added to the store of archæological treasure which has been amassed during the last fifty years. Brown, Jones, and Robinson, who have already got as far east as Pera, Cairo, and even Jerusalem, must be induced to take the great plunge of the Red Sea and Indian Ocean. Not that some of their better-class connexions have not already done so, sometimes under leading-strings, sometimes under mutual protection. We remember to have met members of these great tourist families at the Kútab, where they shot wild turkeys, fired at a female pig, and towards sunset—at the halfway house known as Safdar-Jang's tomb—they were destroying tame pigeons under an Indo-Saracenic arcade, as a happy mode of relaxation on their way from the ruins of old Delhi to the new city of Sháh-Jehán, now our Delhi. That same cold season there were some of the American branch of the same families, whose chief delight and constant occupation consisted in urging too-eager native athletes to jump from the tops of minarets and domes into the tank beneath. Of course these are the travellers whom the pure and simple archæologist would shun, but whom wiser men would encourage, because they require hotels and dák-bungalows, carriages and gháris, guide-books, and the like. All these modern necessities they ask for, but do not always get. Yet, without them travel is difficult and irksome; and then even the archæologist—the pure and simple one aforesaid—forgets to tell his friends that the North-west Provinces of India possess some of the finest bits of natural and artistic scenery, and in November, December, and January, the finest climate, in the world.

When all sorts and conditions of rich people have done this, have grumbled over their journey, and written all kinds of complaints to the newspapers about the want of really-consumable ice at Agra, of torn mosquito-curtains at Delhi, and the absence of comfortable hotels at Lahore, we shall probably get what we want, in the way of archæology, concerning these Mogul cities. Perhaps some excursionist, wiser and more practical than his fellows, may remain to commit to paper, in the shape of plans, sections, elevations, and details—the tombs, palaces, and mosques he went to "do." We remember seeing a few years back at the Dalhousie Institute, in Calcutta, some lithographed instalments (to scale) of a book upon these buildings. They were prepared by Mr. R. R. Bayne, a gentleman who distinguished himself as a student in London before he removed to India, and we have waited to hear if the publication of his book be already commenced, or if it remains still in the throes of preparation. At present there are no really technical works for students upon the architecture of any part of India. Such books as the "Sacred City of the Hindú," by the Rev. Mr. Sherring, as the descriptions and photographs of Ahmedábád and Bijapúr,* as even Mr.

* The mode of spelling Indian names is in a state of transition. To be correct *Lahore* should be spelt Lahár, the river *Hooghly* should be Húgli. But it is difficult for

Fergusson's "Indian and Eastern Architecture," are often difficult to understand by practitioners, and entirely puzzling to the student. What is really wanted is the careful representation upon paper, and to an English scale, of the best Patán and Mogul ruins of the older cities of Delhi—of the mosque of our Delhi, of the Táj Mahál at Agra, and perhaps as a foil to earlier work, of the mosque erected by Aurangzeb at Lahore, in 1674. Scattered over India there are a few Englishmen — and some of these are even reviled officers of the Department of Public Works—perfectly competent to undertake the task; and it cannot be too often repeated that such a task, although it may be aided by sketches and photographs, can only be effectually accomplished by the scientific use of square, compass, and foot-rule. According to the opinions of those who know the difficulties usually encountered in India, no books of the kind we name can possibly be made until the Government of that country organises a special service of measurers and draughtsmen to prepare the necessary drawings. At present, even guide-books to the principal cities are rare; and while the majority are useless to the traveller, none are of any great archæological value. There is, it is true, a well-written and well-illustrated "Agra Guide," by Mr. H. G. Keene, the genial and accomplished judge of that station; and this gentleman has also compiled, from Captain Harcourt's and other writer's pamphlets, a very tolerable guide-book to Delhi. At the beginning of this year a small book on Lahore was also published under the auspices of Mr. J. L. Kipling, a sculptor, and pupil of the late Mr. Birnie Philip. This guide-book describes the city as it is and as it was; the second part of it being to a great extent a reprint of an excellent pamphlet by Mr. Thornton, C.S. Although new to Lahore, Mr. Kipling is no novice in Indian art, for after nearly ten years' artistic service in Bombay he has become the Principal of the Lahore School of Art, and Curator of the Museum, which now contains so large a collection of recently-discovered Græco-Búddhist antiquities.

Those who, without having seen, wish to understand something about the architecture of this small portion of Hindústan, must be good enough to remember that, although the Great Mogul was sovereign of India, he ignored Búddha and Bráhma as thoroughly as the Bráhmans ignore the former; that he felt not the smallest religious sentiment for the waters of the Ganges and the Jumna; that he planted a big mosque in the very heart of Benáres, where devout Hindús still aspire to die and be burnt; that he used the stones of desecrated Hindú temples for the construction of his palaces and mosques,—taking care to conceal whatever sculpture was upon them in the inside of his walls,—more ruthlessly and far more completely than the Hindú had previously attempted with the monuments of Búddhist architecture; and that, far from coming of an old family, his best buildings, which are on the plains of Delhi, are contemporaneous with the best works of mediæval Europe. In the city, which is now called Delhi, there is nothing older than the days of Sháh-Jehán, 1628–1658. Although the empire was founded by Báber, in 1494, the Mogul style did not take its distinctive character in architecture until after the death of Akbar, in 1605. This monarch's principal seats of government were Agra and Lahore; and then the latter city was described as "the grand resort of people of all nations," its glories having been sung 200 years previously as "a city great among the cities of India." The Emperor Akbar's favourite residence was at Fattehpúr Sikri, about twenty-two miles from Agra, and it had been erected under his own direction. In the time of his son, the Emperor Jehángir, in 1626, two Englishmen paid a visit to the Punjáb, and passed over the high road from Lahore to Agra. It then consisted of a loose avenue of trees, extending from "the town's end of Lahore, twenty days' journey to the town's end of Agra." Most of these trees bore a kind of mulberry, and, in our countrymen's words, "every five or six *koss* there are faire seraies of the kings and nobles . . . . where you may have a chamber and a place to get your horse." Fifteen years' later a Spanish monk passed that way, and thus described his arrival at Lahore:—"On the 21st day from our departure from Agra at sunrise we came in sight of the city of Lahore . . . . but large as it appeared, there were not houses enough for the accommodation of the people, who were encamped for half a league outside the city. . . . . I entered . . . . a very difficult undertaking, on account of the number of people, who filled the streets, some on foot, some on camels, some on elephants, and others in small carts, jolting one against another as they went along. . . . . The second city of the Mogul empire (as well on account of riches as its size) is ornamented with fine palaces and gardens, also with tanks and fountains. As for the abundance of provisions it would be unnecessary here to describe it. The principal street shown to advantage would equal the richest European mart." This prosperity occurred in the time of Sháh-Jehán, but it was not destined to continue. Disgusted with Agra, where a tomb was rising to perpetuate the memory of his lost wife, he had ordered the erection of a new palace, a new mosque, and new gardens in the neighbourhood of Delhi. The foundation of this city, in 1635, was a turning-point in the history of Lahore, which, on the accession of Aurangzeb, in 1658, had greatly diminished in wealth and population. When, in 1664, Bernier, a French physician, passed through it, some of its houses were dilapidated, others in ruins. This traveller, who landed in India in 1655, and stayed there some years, described the new colony of Sháh-Jehán, who had made it the capital of the empire instead of Agra, where the summer heats were too violent. "The ruins," he said, "of old Delhi have served to build a new city; and in the Indies they scarce speak any more of Delhi, but only of Jehánábád." With the death of Aurangzeb, in 1706, the Mogul empire practically perished; and, ten years later, in that palace with which Sháh-Jehán had enriched his new city, an event occurred, small enough in itself, but pregnant with the seeds of great changes. A Scotch surgeon, Gabriel Hamilton by name, cured the then emperor of an illness, and was rewarded by "that permission for his employers to establish a factory, and to maintain a territory of thirty-eight towns on the banks of the Hooghly, which was the foundation of the presidency of Fort William." Less than a hundred years after, an English officer described his visit to the ruins of Lahore in his diary, 24th May, 1809:—"Here the lofty dwellings and mosques which, fifty years ago, raised their tops to the skies, and were the pride of a busy and active population, are now crumbling into dust. . . . In going over these ruins I saw not a human being,—all was silence, solitude, and gloom."*

Mr. Keene, in one of his guide-books, calls the plains of Delhi, which cover an area of about ten miles by six miles, the "Rome" of Asia. The comparison is a little inappropriate, seeing that the oldest remnants upon them are not older than the eleventh, perhaps even the twelfth century. The Rome of Asia is the sacred Hindú city; and although successive Indian dynasties have aimed at the historical effacement of their predecessors, there are still in Benáres buildings, portions of which stood *in situ* while Rome was celebrating a triumph to Cæsar, or swaying to and fro under the influence of Cicero's eloquence.† But nothing in Benáres is so fertile in suggestions to the architect, or, as he is represented in India, to the officer of Public Works, as Indo-Saracenic architecture. It was made suitable to the exigencies of climate and local materials by Hindús working in accordance with their own traditions of indigenous art. There is nothing barbarous about it, as in the remains of Búddhist topes and monasteries, or in those of Hindú temples and shrines. The construction of Túglak Sháh's castle, and also his tomb in the middle of what was once a lake, three miles from the Kútab-Minar, betrays a stern simplicity worthy of Greek builders before they attained the refinement of Athens in its prime. The word of the Korán forbids the introduction of images of either men or brutes upon the walls of Mahomedan edifices, both sacred and domestic, and thus all ornament became forcedly useful, or of a literally descriptive character. The Mahomedan gospel was cut in Arabic upon the external face of the red sandstone walls, and forms, perhaps, an incised ornament more beautiful than any similar decoration of either natural or conventional origin. It attracts the spectator, because, although he may not understand it, he is able to feel that it must mean something. The three divisions of an Indian mosque are covered each with a dome, the largest being in the centre. They are entered under a big central archway, and a smaller one on either side, all open to the air, without doors or windows. The mosque itself forms one side of a courtyard open to the sky, with generally a fountain in the middle, and the other three sides are enclosed by covered arcades and sometimes cells. The entrances to the courtyard, generally three in number, resemble triumphal archways; and whether the buildings be the work of men who lived in the days of Ala-úd-dín, or of Shír-Sháh, or of Sháh-Jehán, the system is always the same. There is always enough of truth and science, even in the later buildings in which traditions have not been strictly preserved, to keep them "alive" as examples of architecture. The great mosque of Delhi now stands isolated upon an open square, or more properly a wide plain,—the houses which encompassed it before the Mutiny having been pulled down. It stands alone, a more perfect specimen of refined building than any other work of its own time throughout the world. Begun by Sháh-Jehán in 1644, it was completed in 1658, the same year that its founder was deposed by his son and successor, Aurangzeb,—seventy-eight years after the death of Palladio; eight years before the death of François Mansard; and one year after Christopher Wren had been appointed, at the age of twenty-five, a Professor of Gresham College. Bernier, the French traveller, whom we have already mentioned, described it as "standing upon a rock flatted to build upon, and to make round about a large *place* for four long and fair streets to end upon, and answering to the four sides of the mosque. . . . . The three entries are stately . . . . and their large gates are covered with copper. . . . . That in the middle is much bigger and higher than the two others." Bernier, who saw it a few years after its completion, and who had doubtless seen the brand-new Château of Maisons, admitted that the Delhi mosque was not built according to the *ordonnances* of architecture; but he was wise and honest enough to observe that nothing in it offended the eye. "I rather find it," said he, "to be well contrived and well proportioned." In our own time a pilgrimage to this mosque formed the limits, so says Mr. Keene, to the extramural movements of the once Great Mogul; and here, on a Friday in September, 1857, the fatal year of the Mutiny, was read the last litany of the House of Timúr.

Agra, which, like Delhi, is situated on a bank of the river Jumna, has been called Akbarábád, the city of Akbar; but there is little left in it older than Sháh-Jehán. Although it is known to have been occupied by Báber in 1526, it is probable that the Agra of his time was on the opposite bank of the river, the side on which the railway station is situated. The earliest portions,—mere remnants,—of the palace are attributed to the Emperor Akbar because of their similarity in construction to Fattehpúr Sikri; but they are by no means proved to be the work of the sixteenth century. The fame, however, of Agra, rests less upon its palace than upon the streets of the native city, and upon some of its public buildings; but, most of all, upon the celebrated tomb of Sháh-Jehán's wife, whose name in the vernacular will add no lustre to our description, although she was called "The exalted one of the Palace." This tomb of white marble inlaid with precious stones,—the astonishment and delight of all who visit it, and the paradise of foliage which leads up to it,—is the Táj-Mahál. It is compared by Mr. Fergusson, after a preliminary sentence of apology, to the Parthenon; and on the strange plea that its exquisite inlay suffices to raise it almost to a level æsthetically with the Grecian masterpiece. It is perhaps hardly fair to quote a single passage from one chapter of his book, because other portions of the text in other parts of it balance or soften the argumentative statement to which we allude. A comparison, by means of section and elevation, between the Parthenon and the Táj will suffice to show those who have not seen them that, although they may not be unequal in superficial beauty, yet in every utilitarian view of constructive principle and all æsthetic appre-

us to alter established home orthography. We would merely add that the short "a" is pronounced as the English "u"; that *Akbar* is pronounced Ukbur, and the term *Mogul* has the accent on the first syllable.

* The population of the city of Lahore, according to the census of February, 1875, is 92,035, of whom 40,777 are females; while that of the suburbs is 36,496, of whom 13,785 are females. Of all these, only 1,743 are English. The city contains 19,830 houses, and in the suburbs there are 6,617 houses. See an account of Lahore, 1876. It is printed at the Government Civil Secretariat Press of that city, and prepared by the joint labours of Mr. T. H. Thornton and Mr. J. L. Kipling.

† Mr. Fergusson maintains that there are no authenticated architectural remains in India older than 250 B.C.

ciation of the same, they are manifestly distinct and opposed. It is impossible not to feel, and even see, that the upper portions of the four great entrances to the Táj are as "backless" as any modern imitation of the Greek pediment in London or Calcutta; that the dome, though not a sham like that of St. Paul's, or an utterly false excrescence like that of the "Invalides," is built up for show alone; is full of emptiness, or at best the home of birds and insects; and merely marks a vaulted structure, smaller than itself! The useless upper story or dome is half as big again as the lower one which it covers; while the real tomb, where the fair lady's body lies, and that of the Emperor's beside it, is beneath both in a basement,—on a level with the soil, if not a little below it. We leave any one, who has studied Mr. Fergusson's valuable theories upon the principles of beauty in art, to say whether Athenians of the time of Pericles would have loaded the earth so uselessly even to obtain an outline so beautiful as that of the Táj-Mahál.

Delhi and Lahore contain each a museum; and three years ago there was a small collection of antiquities and local curiosities in a building at Agra; but these, we believe, have been removed to Allahábád. To the Lahore Museum have been consigned many of the justly-celebrated sculptures recently dug from the soil of the Punjáb. These are remarkable, as evincing the influence of Greek culture upon Búddhist art. Among them are capitals of the Corinthian order, which Mr. Fergusson, judging from photographs, describes as more Greek than Roman in their foilage, and more Roman than Greek in their volutes. There are also fragments of the human form, carved in a soft micaceous sandstone, all referring to Búddha, but unmistakably Greek in inspiration and character. They are described by some who have seen them as "architectonic and conventional," but never monstrous, like ordinary Búddhist and Hindú sculptures. Mr. Fergusson considers that it would be correct to call them Byzantine; but he significantly adds, and we sincerely hope that the authorities will afford an early opportunity,—"till we have *detailed* drawings, and know more of their surroundings, it is difficult to give a positive opinion as to their age."

The characteristic craving of the Tartars for tomb-building and garden-planting was very powerful in these Mogul cities; and under English rule there seems to be every disposition to encourage the development of the latter, or rather perhaps to revive it. The Emperor Báber began his improvements at Agra by laying out a garden which was long a subject of wonder to the natives, who chose to call it Kabul. "God Almighty," said Bacon, "first planted a garden"; and while tradition has assigned that of Eden to the Kabul valley, living men are ready to point out the exact spot in the island of Ceylon! It is certain that the Hindús have no native term for a garden, and that their common word "bágh" is Persian. "Coming," says Mr. Thornton, "from the well-watered valleys of Ush and Andejún, Báber regarded with almost European disgust the dusty, treeless, plains of the Punjáb." At the present day, however, Lahore, Delhi, and Agra are studded with public and private gardens. To all outward appearance they seem to be charming abodes, and in December are undoubtedly so in fact. Spreading as the English portions of them do for miles in all directions,—into cantonments for the military, into lines for the police, and into civil lines for the Government functionaries, high and low,—they resemble somewhat the picture which has been prettily drawn of Babylon. They are small fortified provinces rather than large cities, and consist of country-houses, with farms and gardens attached. The last King of Delhi, who, after the Mutiny, solaced himself with poetry, wrote in Urdú:—

> "Call not Delhi a city,—call it rather a garden,—
> The abode of perfect peace;
> But the book of its past is blotted out,
> And nought remains but a desolated village."

Although no one probably is unwilling to admit that under English rule the cities of India form "the abode of perfect peace," it is faint justice to the royal poet to confess that, as far as Indian architecture is concerned, "the book of its past is blotted out." It behoves us, therefore, to help the natives of the North-west Provinces at least,—for our own more than for their sakes,—to re-write it; and afterwards to apply its teaching, with the broader experience and more powerful instruments of our own more progressive civilisation.

PROFESSIONAL CHIVALRY.

A GOOD deal was said, not long since, and well said, by a respected member of the architectural profession, on the subject of professional *esprit de corps*, the want of it in our profession as compared with some others; the value of such a fellow-feeling and sense of common interests in binding the members of the profession together, and in raising the status and tone of feeling of the whole body corporate. And it would be difficult to over-estimate the value to the members of a profession, or the gracefulness in the eyes of the rest of society, of that sort of spirit which leads men of the same pursuit to stand by each other as natural allies, and to combine in keeping the standard of professional conduct up to a high point of honour and integrity. These considerations, valuable as they are, refer, however, mainly to the profession regarded in its practical and business relations, and as comprising a society of men governed, or who should be governed, by a code of honourable dealing in regard to each other and the public which is to be rigidly maintained. Without pausing here to inquire how far this desirable ideal of professional *esprit de corps* has been and is realised, we may remind each other sometimes that there is even a higher standard than that which may be aimed at, and which perhaps affects individual character rather than that of the profession *en masse*, but the effect of which would be, if it were more generally kept in view, to raise not merely the status of the profession morally and socially, but that of architecture itself, in its results and in its character as an intellectual and artistic occupation. What we mean is that kind of feeling which leads a professional man, more especially an artist of any class, to aim, in the first instance, at doing the very highest work that he can get, and doing the very highest with his work; which would lead him to prefer carrying out a few works, and those of a high class, really well, even at no great pecuniary gain, to "getting on" and making money by a more promiscuous practice carried out on less uncompromising principles; an end which, if steadily and firmly kept in view, results perhaps in something as near what may be called "chivalry" of principle and aim as mere professional life in modern times can very well attain.

Some reflections of this kind are suggested by the prefatory remarks to the interesting and agreeably-written memoir of three deceased French architects, read at a recent meeting of the Institute. Speaking at the outset of the pleasure which he had derived from the process of collecting information for the paper of "Biographical Notices of Deceased Foreign Members," Mr. Cockerell observed that this pleasure arose from the contemplation of the high qualities of the subjects of his notice. "I find," he said, "in a remarkable degree in the lives of these French artists a quality which, if it is not peculiar to the French as a nation, is at least one of their very marked characteristics, and has shown itself in other walks besides intellectual ones; in war, in missionary enterprise, in the relation of the affections. I mean a certain chivalry and self-sacrifice, which in its various spheres of action amounts frequently to heroism. In the subjects now under consideration I find a high ideal involving a high ambition, pursued with a singleness of aim and an untiring energy and devotion which is quite unsullied with any taint of greed. The early ambition of these men, whether they are born to ease or to toil, is not to rush into practice and to secure commissions, but to distinguish themselves in the schools, and to gain its honours and their prize,—the Grand Prix. When they achieve professional success, their ideal is not to multiply jobs, but to carry out with conscientious perseverance some one or very few works. When we consider the time occupied in one of the great public works, and learn that their authors have scarcely any others simultaneously, we may judge how great is the sacrifice which they make of comfort and luxury to the attainment of perfection." These remarks are exemplified more or less in the lives of the three French architects which formed the subject of the paper here quoted from,—Duban, Vaudoyer, and Labrouste. The first of these spent some of his best years in studies which brought him honour, and gave him proficiency, but for a long time no other result; and he never carried out one building entirely from the first conception; for even the École de Beaux Arts did not fall into his hands till its main plan was arranged, and the foundations laid. It is impossible to suppose that one who had acquired the reputation which he had, at an early period of his career, might not have had more work to do, had he been disposed to take what offered itself. That he had not more we must apparently attribute to a high ideal of his profession which induced him to decline any chance of occupation in its every-day walks, and rendered him indifferent to anything except the class of building in which he could carry out and illustrate his own aspirations. His high sense of professional dignity and responsibility was shown in his retiring from the position of architect to the Louvre rather than yield to Governmental and public opinion in a point where he believed himself to be right. Vaudoyer, after pursuing the same kind of hard study in pursuit of honours in the early part of his career, adopted in his professional practice the same uncompromising principles which Duban appears to have acted upon. He commenced by opening an *atelier* for pupils, and contented himself with this until work came which he thought worthy of his exertions. He rejected, throughout his life, all private work "which might subject him to the caprice of clients, or force him to devote to sordid and trivial considerations the time which he could so much better employ in the advancement of art and of his own reputation." It is true that Vaudoyer had independent means; but even under such circumstances this high ideal of professional practice is unusual, to say the least, in our own country. Of Labrouste we are told that "he regarded his art as a thing sacred, and not to be profaned by superficial treatment, or by application to sordid and common purposes; and to this must be attributed the fact that he never sought or obtained success in ordinary practice." Almost his first practical work in building was the Library of Ste. Geneviève, which was not undertaken till he was forty-two, and to which he devoted seven years almost exclusively, giving attention to every detail both of design and practical construction throughout the building. And in contemplating this kind of principle of carrying out architectural work, one cannot but echo Mr. Cockerell's observation,—"These lives may, indeed, put us to the blush, and I cannot but feel with humiliation how great is our need of the study of them."

All professions in all countries of course include those, often a majority, who enter them and continue in them with nothing but the most sordid and what might be called beggarly views and aims. The sort of man who says, on being convinced of some serious defect in a building he has recently completed, "Never mind, I have got my commission," or he who openly avows that he cares for nothing but what will pay (and we have heard both these statements made in sober earnest, and by educated men), are not, perhaps, worth any serious arraignment. They have their reward, and may be left to enjoy it. But among those architects in this country who have a higher ambition than that, who wish to produce something that will bring them fame, who have even acquired reputation and some degree of wealth, the idea of refusing anything either because they have not time to give proper attention to it, or because it involves what, on their own principles, they ought to disapprove of, seems hardly to be contemplated as a possibility. We remember a case that happened to come to our knowledge some little time since, when a point was raised in reference to the restoration of an old building, in regard to which the architect stated in writing his opinion that a certain method of treatment demanded by his clients was contrary to true archæological principles, and to all that he had been advocating himself for years back. The point was nevertheless insisted on. Did the architect (a man in large practice and presumably in no absolute want of one particular commission) decline to stultify himself and withdraw? By no means: he put his principles in his pocket, and did the wrong thing while he protested against it:—

> "And there it stands unto this day,
> To witness that he lied,"—

as practically he certainly did, against the highest interests of the art and the profession. But we fear the course was only what almost every English architect would have pursued; grumbling, perhaps, but averring that he could not do otherwise. The case of some large public buildings, carried out by an eminent architect in a style opposed to all his expressed convictions, because Government would have that style and no other, will occur to many. We have no wish in one

sense to bear hardly on such cases, because they, in fact, result from following the usual standard of professional architectural morality in England, in which it is regarded as a rule of business and common sense not to refuse work. And in the case of men in small practice and struggling for their daily bread we hardly know what other rule can practically be applied. Nor in the case of those who are better off do we wish to say that there is anything absolutely or morally wrong in such a proceeding (though we can quite conceive some highminded people thinking that there is). But what is pretty evident is, that the course which a successful and eminent English architect would feel himself quite at liberty to take in such a case, a French architect of the same standing would consider beneath him, and a degradation of himself and his art. This is a matter worth very serious consideration. It is recorded that a certain sprig of German royalty brutally told Humboldt, whom he objected to have to meet on equal terms at Court, that "there were two sorts of persons who could always be had for money, authors and ——," a certain even less respectable though more ancient class. It would be very sad to add architects to such a category; nor will any impartial person, we think, assert that the architectural profession in England is more griping than other professions; it is certainly worse paid than most, as a rule. But we fear it must be accepted as a fact that English architects are willing to undertake, from ordinary motives of business, commissions which involve a departure from their acknowledged principles or which should be beneath their ambition, and that French architects of the same relative standing will not do so. And this is hardly a satisfactory reflection to have to make.

There is another point of view in which the question of the highest professional principle, or what we have called architectural chivalry, comes in, and which is directly forced upon us also by the biographical notices we have referred to. This is as to the degree of attention which a large and important work ought to have from its architect, and the artistic morality of accepting a multiplicity of smaller commissions when a man has one great and important work to which he ought to give all possible attention. Here again we shall be flying in the face of business principles and what in England is called "common sense," which seems often to mean merely looking out for "number one." We suppose an English architect who refused two or three smaller things because he considered his undivided attention was claimed by a large and important work, would be considered Quixotic and neglectful of his own interests. It is the fact, however, as we see, that in France this is rather the rule than the exception among architects of the highest order, and that it is not uncommon for a man to devote years to elaborating a single building. Whether this be Quixotic or not, we have no hesitation in saying that this is a principle that ought to be more acted upon in England than it is. There are two or three great buildings now in progress in this country which, in order to be carried out in a really satisfactory and complete manner, ought to claim the undivided attention of their architects, who, in fact, are responsible perhaps for two or three score of smaller works at the same time. It is not surprising under such a system that architectural design comes to have such a look of mechanical repetition, and such a want of thought and refinement in detail, and that the evil of designing and drawing by proxy is continually on the increase. The love of money in this country is demoralising all classes, and it can hardly be expected that the architectural profession should have escaped the contagion; but, whether the reminder be of any avail or not, we cannot help asking them to look for a moment at the evidence of the existence and acceptance of a very different theory and principle among their French brethren which has recently been laid before the Institute, and to consider whether there is not possible in architectural practice such a thing as "chivalry," the essence of which quality lies in the abnegation of mere selfish ends, and the postponing of material success to the greater aim of doing as well and as nobly as possible that which we have undertaken to do.

Quebec Harbour.—The Quebec Harbour Commissioners have instructed Messrs. Kinipple & Morris to prepare contract drawings for proposed improvements.

THE INSTITUTE SOIRÉE.

THE annual entertainment of the Institute of British Architects was held on Friday, the 14th inst., at the Rooms in Conduit-street, and may be considered a very successful one, more especially in regard to the appearance of the rooms. In the upper room, where the guests were received by the president, Mr. Charles Barry, there was the usual array of objects lent for the evening, including artistic furniture, water-colours, paintings on china, designs for ornamental work of different kinds; and we should be disposed to say that there was a larger amount of objects possessing special interest than usual. A model of the new Opera-house on the Thames Embankment was exhibited; and in the Library some curious old volumes of illustrations of the principal towns of Europe were turned over with a good deal of interest. We noticed some of Mr. Pullan's oil sketches of architectural remains in the East, and some fine architectural views by the late D. Roberts.

In the downstairs room there was a certain novelty of effect, in comparison with what we have been used to at the recent *soirées*. Usually there has been some exhibition of paintings going on in this room, and these have been left in their situation to form part of the decoration of the evening. It is not, however, possible to look at pictures with much satisfaction when they form the background to a row of heads of persons occupying the seats against the wall; nor in most cases have the pictures which have happened to be present been much worth looking at. It was therefore an agreeable surprise to find, instead of this exhibition of doubtful art, that the walls were hung with strips of decorative carpet and curtain stuffs, of very good character in detail, and presenting a very satisfactory *ensemble;* and one effect, as it seemed to us, was to make the room appear considerably larger than when the walls were crowded with gilt frames.

The Royal School of Art Needlework at South Kensington was represented by some beautiful examples of curtains, and a screen, executed for the Duke of Westminster from designs by Mr. Walter Crane. Messrs. Trollope contributed from their Museum of Decorative Art numerous costly objects, including specimens of modern French *cloisonné* enamel, alabaster and onyx, ancient tapestry, &c. Of English ceramic art and decorative pottery there were some fine examples executed by Mr. J. Mortlock, and several pieces of modern "lustre" ware, cleverly reproduced from old designs of Mr. W. de Morgan. In addition to several choice cabinets of rich workmanship and other decorative furniture exhibited by Messrs. Jackson & Graham, the same firm sent a large quantity of Oriental pottery, fine Japanese lacquer, and articles of bric-à-brac. The Persian, Indian, and other textile fabrics (some of them very rare and costly), and which lined the walls, as already referred to, were contributed by Messrs. Gillow and by Messrs. Farmer & Rogers, together with a selection of Morris & Co.'s quaint and boldly designed curtains, Mr. Holbronner's woven fabrics and similar specimens of textile art,—all showing the advance which has been made of late, both in taste and execution, by English looms. In the department of artistic metalwork, a similar improvement was noticeable in the productions of Messrs. Benham & Froud, and of Messrs. Hart, Peard, & Co. A conspicuous object in one of the rooms was a pulpit executed entirely in decorative stoneware and glass mosaic, by S. Belham & Co., from the design of Mr. J. P. Seddon.

The band of the Coldstream Guards was in attendance in the downstairs room, and contributed in the usual form to the entertainment of the evening. Some of our readers may remember that a question was raised the other day as to the suitability and merits of the musical part of the entertainment by a correspondent, whose letter was inserted, as it appeared that the subject was open to consideration, though without the idea that any decided improvement could be organised in time for the present occasion. We have reason to believe, however, that the opinion expressed by our correspondent met with a good deal of concurrence, and that some improvement may very well be made, and, in fact, ought to be made, next year, upon the present somewhat old-fashioned style of thing. The band did better, we recollect, when a gallery was available for its accommodation. On the floor it is universally found to be too noisy, independently of the musical question. But we think the latter should be considered. To go on always in the same way, saves a good deal of trouble, no doubt; but is not always the best way of, keeping up the interest of an entertainment, seeing that tastes and habits change very much. In a general way the Institute *soirée* is, on the whole, hardly so brilliant an entertainment as one might expect from the means and influence of the Institute; and one or two happy innovations, to put a little new life into it, might very well be welcomed, and may perhaps be looked for from the new administration.

NORTHUMBERLAND AVENUE.

THE statement which has been published as to the letting of the "leg of mutton" plot, as it has been called, bounded by Charing-cross, Northumberland-street, and the Avenue, was premature. An offer to the tune of 15,400*l.* per annum is before the committee, and if that should fall through there are others from responsible persons to very nearly the same amount. The rent offered is equal to 8*s.* per foot superficial. Plot 24 has been let for 500*l.* per annum (5*s.* per foot); and plots 9 and 10, together, for 1,620*l.* per annum. These large prices give good grounds for the belief that the improvement will return a money profit to the ratepayers.

THE LIVERPOOL ARCHITECTURAL SOCIETY AT SHREWSBURY.

ON the 8th inst. the members of the Liverpool Architectural Society held their annual excursion, when Shrewsbury was visited. The gathering of members was not so large as anticipated, but the entire excursion from beginning to end was a success. The members were accompanied by their president (Mr. J. A. Picton, F.S.A.), their ex-president (Mr. J. Boult), and one of their vice-presidents (Mr. Henry Sumners), Messrs. Aldridge, Herbert, Fry, &c. The church of St. Mary was first visited, and here Mr. Edmund Sharpe met the members, and discoursed on the several gradations and varied styles this church has passed through since its foundation. This church is said to have been founded by King Edgar about the year 980, but since that date it has passed through many vicissitudes. It was very rich in the time of Edward the Confessor. It stands upon a commanding position, and, together with that of St. Alkmund,—which church was founded by Ethelfleda, daughter of Alfred the Great,—their spires can be seen almost from any part of the county of Shropshire within ten miles of the capital town. Mr. Sharpe lucidly pointed out the many points of construction at the hands of successive architects at different times, until at last came the restoration of Mr. S. P. Smith, of Shrewsbury, at whose hands most of the churches and ancient buildings throughout this district have been almost reproduced. The abbey was next visited, noting on the way the half-timbered houses, the old market-hall, and other objects of interest, and the fine old pile, or rather that which remains of it, received due attention. Here also Mr. Sharpe gave a descriptive lecture, and the interior was pronounced by all well worth examination. After leaving the abbey the members separated, some visiting Haughmond Abbey, Battlefield Church (originally built to commemorate the victory of Henry IV. over the Earl of Northumberland and his son, Percy Hotspur), others finding their way to Quarry Avenue, one of the most celebrated promenades in the kingdom. The company afterwards dined together in the Lion Hotel, and returned to Liverpool in the evening.

Proposed Modification in Asphalte Road Pavement.—Admirable as is asphalte as a road material in point of smoothness and cleanliness, it has, as it has been hitherto laid down, the great disadvantage of being exceedingly slippery, and therefore dangerous, at certain seasons. It is said that there is now a fair prospect of this difficulty being overcome, the Val-de-Travers Company having recently introduced slabs of their asphalte, upon the surface of which are studs of chilled iron. These studs are starlike in shape, and are distant about 3 in. from each other. It is claimed that these give absolute security against slipping, and that consequently the slabs are specially useful within, and at the sides of, tramway rails. They can, it is stated, be laid down at the same cost as granite setts.

THE RAILWAYS OF BELGIUM.

THAT illustration of the working of the railways of the United Kingdom which may be afforded by a comparison with the systems adopted in other countries, is a subject not unfamiliar to our readers. It is to the accounts of the French railways that our attention has been chiefly directed hitherto, as it is in this case that the fullest information has been accessible to the student of the subject. Without inquiring how far the tone and temper of a nation, and the general tenor of the laws and institutions of a country, may render different modes of executing and conducting public works advisable in different States, it is possible to form a judgment as to the superiority of system considered with reference to its professed object alone. Thus, it is possible that the French system may be, considered in itself, better than our own, while yet invincible obstacles may exist to its introduction into this country. It is with the prime question that we alone concern ourselves at present. In the French lines there has been a degree of State interference which has resulted in a good distribution of railway network over the country, regarding the requirements of the several districts as more important than the sole question of remunerative traffic in the first instance. Again, in consequence of the guarantees afforded by the Government, it has been possible so far to raise capital at the ordinary rates of interest as to secure to the original shareholders an average benefit of more than ten per cent. on their investments. Finally, it has been arranged that the entire property of the lines of railway shall, at a definite period, return to the State.

A condition of things so contrary to that which has prevailed in this country has been pretty generally understood to exist in France, although the details may have been less familiar to our knowledge than was desirable. In Belgium there exists an organisation of the railway system which differs as much from the French method as from our own. But the facts regarding the Belgian lines are far less known, and far less easy to ascertain, than those relating to either the French or the English railways. It is not as matter of detail alone that this difference exists. It is a profound difference of principle that is involved. It is conceivable, at least in theory, that it might be worth while for a State to provide gratuitous means of transport for passengers and for goods over its territory. It cannot be said that this experiment is actually in progress in Belgium; but there is, at all events, a certain approach to it. The Belgian lines are worked at tariffs so low that where they are adequate to cover actual working expenditure they still leave interest on capital to be borne, at all events in great part, by the tax-payer. In a country in which taxation is more complicated than perhaps in any other, it has proved comparatively easy to adopt a system of which the results demand very careful study.

The public accounts of Belgium are to a great extent smothered under their own fulness and multiplicity of detail. As to audit, it is said that the perfection of system has been attained. But for that clear, incisive statement which the general reader can at once comprehend and remember, we look in vain. Thus as to the railways, which now form a portion of the public service of that country, we find much detail, but no general *resumé*. The estimates and accounts are not only extremely diffuse, but are drawn up in different forms. The accounts of past revenue are all that can be desired; those of expenditure are always imperfect, tardy, and perplexing. No less than three out of the twelve budgets into which the public accounts are divided have to be studied in order to arrive at anything like a railway balance-sheet. The gross receipts on the various lines are given in the Budget of Ways and Means. The working expenses are stated in the Budget of Public Works. The interest on loans is given in the Budget of Public Debt. An estimate of the future year is nowhere given, and can only be made up in an uncertain manner by calculations based on these several budgets.

We are indebted to Mr. Barron, her Majesty's Secretary of Legation at Brussels, for the best guidance available in this perplexing labyrinth. In a report, dated in April last, Mr. Barron has given an elaborate statement of the population, revenue, expenditure, taxation, and debt of Belgium, from which we are able to gather much positive and valuable information as to the Belgian railways.

When it is borne in mind that, in spite of the elaborate minuteness of the fiscal system of Belgium,—vendors of spirituous liquors, for example, paying sixty-six different rates, varying from 1·06 fr. to 185 fr. per annum,—the national revenue and expenditure are the smallest of any, and the whole incidence of taxation is only 1·463*l.* per head of the population, against 2·100*l.* per head in Great Britain and 2·852*l.* per head in France, it is clear that a system so special deserves study. Regarded in itself alone, as a self-supporting branch of the public service, the railway organisation of Belgium is economically indefensible. What may be its merit as an integral part of a general fiscal and financial system producing such enviable results is another matter. Into that we do not now attempt to enter. But it is needful to bear this in mind in order to show that it is for the sake of analysis, and not for that of criticism, that we investigate the operation of the railway system of Belgium.

The length of the Belgian State railways at the end of 1874 was 698·5 kilomètres. That of the connected lines worked by the State was 944·7 kilomètres. To the total of this State "*réseau*" of 1,643·2 kilomètres thus arrived at has to be added 309·8 kilomètres, being the length of the Grand Luxembourg Railway, purchased by the State in 1873, and that of conceded lines worked by various companies, amounting to 1,478·6 kilomètres. This gives a total length of railways worked in 1874 of 3,431·7 kilomètres, or 2,128 English miles.

The capital actually expended by the State down to the end of 1874, raised either from its ordinary revenue or from loans, was 382,177,773 francs. Adding the value of three annuities charged on the railway for the purchase of two lines and of certain rolling-stock, the gross capital is raised to the amount of 421,000,000 francs, or 16,840,000*l.* It is not distinctly stated in the report whether the whole of this sum is chargeable against the lines owned by the State, including the Grand Luxembourg Railway. If this be the case, the nominal cost of construction will average nearly 27,000*l.* per mile. The capital expended, and thus the price per mile, will be seen to be very considerably in excess of that which is stated in the *Annuaire Officiel* of 1873, as calculated up to the end of 1871. But the price above arrived at is not that of construction alone. It covers all the annual deficits in working since the opening of the lines. In this respect the information supplied by the Belgian budgets is not only imperfect, but misleading. It is desirable to have a statement of actual cost accompanied by a table of annual deficits in working. In the absence of this information, our estimate of cost can be only approximate, whether we rely on the *Annuaire Officiel*, or on the report of Mr. Barron.

The official balance-sheet sets down the value of the railway property of the State at the above figure of 421,000,000 francs regarded as prime cost. This is a mere illusion, as the depreciation of plant and working stock alone would very considerably reduce the value of the assets, supposing all expenditure to have been incurred in *bonâ fide* construction and purchase. The State owes, on this score, 248,000,000 francs in the form of redeemable debt, and 77,000,000 francs in the way of treasury advances, or 13,000,000*l.* sterling in all. The principle of the law of 1834 was that the railway should purchase itself from its own earnings, thus finally costing nothing to the State. But no profit thus applicable has accrued. The charge for interest on debt is rapidly increasing, and the net revenue of the line is small and precarious. The sooner the matter is regarded in its true light the less will be the ultimate complication.

The cause of this anomalous condition of affairs is the extremely low tariff in force on the Belgian lines. The gross receipts per mile in 1874 are a little higher than those of the railways of the United Kingdom were in 1870, being 2,871*l.* per mile. But the working expenses for the same year amount to 1,961*l.* per mile, or rather more than 68 per cent. of the gross revenue. The passenger-rates are incredibly low. For a single journey they are per mile: first class, 1·088d.; second class, 0·816d.; third-class, 0·514d., with a reduction of about one-fourth for return tickets. The average length of a passenger journey appears to be about six miles, as the number of passengers carried in 1874 were 29,457,707, and the receipts amounted to 24,929,327 francs. The proportion of revenue from heavy goods to the whole traffic receipts is about 54 per cent. That which prevails in the United Kingdom is 56 per cent. The goods tariff is proportioned to the distance travelled. Distances are divided into six zones, and goods arranged into four classes. The shortest zone is below fifteen leagues, each league being equal to five kilomètres. The longest zone is above forty leagues. For the first set of distances the charge rises from 0·6d. to 1·51d. per English mile per ton. For the largest zone the rates vary from 0·15d. to 0·60d. per mile per ton. Coals for export are carried for one-tenth of a penny per ton per mile. Mr. Barron justly remarks "such freights cannot possibly pay. Under the present tariff heavy goods are carried at a positive loss to the State."

Although the passenger traffic shows a steady increase, both in numbers and in revenue, for the years 1872-73-74, the goods traffic in the last-named year exhibits a falling off as compared with 1873. The respective tonnages were: 1872, 13,076,981 tons; 1873, 13,775,425 tons; 1874, 13,287,652 tons. The receipts for the same years were respectively 47,210,401fr., 48,636,707fr., and 39,329,920fr. The official returns, as before intimated, fail to present any distinct statement of the net income. Mr. Barron has deduced from a comparison of the different budgets that the net revenue fell from 23,000,000fr. in 1871 to 9,000,000fr. in 1873; rising to 12,483,000fr. in 1874. The latter sum represents a return of 2·97 per cent. on 371,969,074fr., the capital spoken of as "utilised" in 1874. This is a sad falling off from the years 1864 and 1871, which produced over 7 per cent. As the interest to be paid on the debt ranges from 4½ to 5 per cent., it is evident that such a net return as a little under 3 per cent. involves a practical bankruptcy. The matter is made apparently worse than the truth by the mode of swelling the capital to which we before referred. But in brief the Belgian Government are now subsidising the travelling and freighting public at the rate of at least 20 per cent. on their actual outlay. The tariff being so fixed as to give a net revenue of 31¾ per cent. of the gross revenue, produces a return of 3 per cent. on a capital on which the State has to pay 4½ to 5 per cent. It would require an augmentation of the tariff by at least 20 per cent. to make the railways of Belgium solvent and self-supporting enterprises. To the extent here indicated the traveller in Belgium is subsidised by the State. How far that subsidy is justified by the impulse given to the general industry of the country is matter for very serious consideration.

ACTIONABLE NUISANCES CAUSED BY BUILDINGS.

THERE are probably few points of greater importance to those who are in any way engaged in the designing or construction of buildings than a clear notion of what constitutes an actionable nuisance. A proper appreciation of the true bearings of this subject would often cause much money to be saved which is spent in expensive litigation or in subsequent alterations consequent upon the decree of a court of law. It is quite true that nearly every such case depends upon the particular facts and circumstances by which it is surrounded. At the same time, if the principles which govern this branch of law are fairly grasped, there is no reason why many cases which are now decided in the courts of law should not be prevented, in the first instance, from arising at all. A nuisance may be defined as anything which annoys a person or is injurious to his property, and which arises from the property of another. A further and important element in a legal nuisance is that it must be a continuing act or series of acts, not a merely isolated and temporary one. English legal writers are very chary of giving precise definitions, and one of a nuisance will be vainly sought for in the text-books, but the above proposition, in the absence of any definition by leading legal authorities, is given as containing the chief characteristics of a legal nuisance. The element of continuity is of marked importance, for it is this which chiefly constitutes what in legal parlance is termed a nuisance. For if a spout on my neighbour's house suddenly pours a quantity of water on to my roof, and through my roof it penetrates to my rooms below, he is liable, if this accident was preventible, in damages for injury done to my property. Yet it is a simple wrong and in no way a nuisance. But if every time there is a fall of rain this spout pours its contents on to my roof, a distinct element of continuity is introduced, and a legal nuisance is the consequence. But a legal is not necessarily an actionable nuisance, and it is this fact which has

caused many hasty and ill-advised persons to demand redress for what they have wrongly supposed to be an actionable nuisance. An actionable nuisance has been defined by a very able judge to be "an inconvenience more than fanciful, more than one of mere delicacy or fastidiousness, an inconvenience materially interfering with the ordinary comforts physically of human existence, not merely according to elegant or dainty modes and habits of living, but according to plain and sober and simple notions among the English people" (Walter *v.* Selfe, 4 De Gex & Smith, 315, 1851). If this somewhat involved sentence be carefully considered, it will be found to contain the key to the decision of all questions which may arise upon this subject, the crucial test of all such questions being whether the act complained of materially interferes with the ordinary comfort and arrangements of an ordinary existence. If we judge all the reputed cases by this test, it will be found that it tries them fairly.

Taking this definition as the guiding principle, some cases may be pointed out as examples of it. But questions of nuisance, in so far as they are connected with buildings, arise in comparatively few ways. To group these several ways will further simplify the understanding of this subject. Legal actionable nuisances may arise from buildings in a threefold form, either from position, construction, or use. Every nuisance will be found to be produced by one or some of these causes. To touch briefly on the first head, the *position* of the building must be such as to interfere substantially with the ordinary habits of mankind, in order to bring it within the scope of the above-mentioned principle. A very good illustration, negative in its character, will be found in a case decided some ten years ago in the Court of Chancery (Smith *v.* Owen, 35 Law Journal, Chancery, 317). Mr. Smith was the owner of a shop in Bond-street, and Mr. Owen was the owner of the adjacent house. The latter commenced alterations in his premises which would throw the front further into the street, and thus prevent Mr. Smith's shop from being seen so far down the street as it formerly was, and consequently the goods in the window would also not be perceived so soon by the passers-by. Mr. Smith accordingly filed his bill in the Court of Chancery asking for an injunction to prevent the defendant from continuing his alterations. But the present Lord Hatherley, then Vice-Chancellor Wood, held that "there was not such an amount of injury as would induce the Court to grant an injunction: all that could be complained of was that persons could not see the goods as soon as they might if the alterations objected to had not been made." Here it was not a question of ordinary comfort, or of ordinary arrangements being injuriously affected, and it is quite clear that the objection was rather fanciful than real. If the building had been altered in such a manner, had that been possible, as seriously to diminish the plaintiff's custom by shutting out the view of his window, this would have been a very different thing: it would have been a substantial inconvenience. It is at all times a question of degree, but that degree must be tried by the test whether the inconvenience is fanciful or substantial.

The next point is that of the *construction* of a building.

In some respects construction does not differ very materially, as the example last given shows, from position, but cases may arise which are not so near the border-line as that which has just been touched upon. The most frequent way in which construction causes an actionable nuisance is by depriving a person of light and air. But it must be borne in mind when dealing with this point that the surrounding circumstances will be taken into consideration. What might fairly be considered an actionable nuisance at the West End may not be one in the City, where the size of the buildings and the course of trade necessarily render the same amount of enjoyment of sunshine and air impossible. The case which we propose to use as an example of nuisance arising from construction, again a negative one, will serve also as an instance of the necessity of taking into consideration the place where the nuisance is said to arise. The reversioners in fee of houses on both sides of a court in the City of London sold their reversion of a house on one side of the court to a person who at the same time obtained from the termor an assignment of his interest. The purchaser cleared the site, and on it and on adjoining land commenced building in such a way as to interfere with the access of light and air to the vendors' houses on the opposite side of the court. As a matter of fact, the new buildings exceeded by 16 ft. in height the old block. "But," said Lord Justice Turner, "it is not every impediment to the access of light and air which will warrant the interference of this Court. Some material or substantial injury must be established." And, again. It may well be believed that in such a court as this it would be difficult to find sufficient light to work at all times, or even, perhaps, at any time in the day in the month of November." Accordingly the plaintiffs were unsuccessful in this suit (The Curriers' Co. *v.* Corbett, 4 De Gex, Jones, & Smith, 76[1], 1865). When we come to consider the third head, that of nuisances arising from the *use* of a building, we find that the surrounding circumstances are even of greater importance than when it is a question of construction. Thus among a number of factories the owner of a house annoyed by the many disagreeable concomitants of a manufactory could scarcely obtain relief, but if a noisy factory is placed among a number of dwelling-houses, it is probable that the owner of the factory would be prevented from continuing his operations in the same manner. But a very good instance of the improper or materially inconvenient use of a building will be found in a case decided in the present year (Broder *v.* Saillard, 45 Law Journal, Chancery, 414). The facts of the case are very clearly related in Sir George Jessel's judgment: "The position of the defendant," he said, "is a remarkable one; the original plaintiffs are the owners of a house in St. George's-terrace, Primrose-hill. The defendant is the lessee of Hill View, a house standing immediately above the plaintiff's house. He is in a very unfortunate position. He seems to be a merchant who has taken a house, with a stable adjoining, at a high rent, and on the usual terms. The plaintiffs find their tenant threatening to go away, on account of the noise which was inflicted upon him by the horses in the defendant's stables." Further on the Master of the Rolls observed,—"I take the law to be this, that a man is entitled to the comfortable use of his dwelling-house. If his neighbour makes such a noise as to interfere with the ordinary use and enjoyment, and to cause serious annoyance and disturbance, the owner and occupier of the dwelling-house is entitled to be protected from it." Of course, this is again, to some extent, an instance of a faulty construction, but it is also an equally good instance of use, because the manner of using the adjacent building was the actual cause of the nuisance. By using it for the same purpose, but with greater care, the noise of the horses might have been considerably diminished. A still more striking instance arose when the ground-floor of a house in Green-street, Grosvenor-square, was used as a stable (Ball *v.* Ray, Law Reports, 8 Chancery, 467). This was a distinct instance of the use of a building in a special manner being the actual cause of the nuisance complained of, to which the judgment of the Court put an end, and is perhaps a more useful example than the similar yet more recent case decided by the Master of the Rolls. It would be beyond the range of a sketch such as the present to go further into this branch of the law, and into such essentially legal portions of it as have to do with acquiescence in the nuisance, the length of its existence, and so forth. The portions of it upon which we have touched are those which most vitally affect persons engaged in planning or advising upon buildings. If these principles, which have been briefly pointed out, be properly considered and applied either to the examples already given here, or to those which are constantly occurring in the course of professional duties, or which may be found by the dozen in law reports, they will not be without value to all whose work obliges them to consider the subject.

E. S. ROSCOE, Barrister-at-Law,
Author of "Outlines of Civil Procedure."

Population of the Principal Towns of Scotland.—The Registrar-General of Scotland reports the following as the estimated population of the eight principal towns in the middle of the year 1876:—Glasgow, 545,144; Edinburgh, 215,146; Dundee, 139,125; Aberdeen, 96,499; Greenock, 70,192; Leith, 52,919; Paisley, 48,679; Perth, 26,535. The total is 1,194,239, or more, by about 18,000, than a third of the population of Scotland. Since the census the registration area of Glasgow has been extended, and that of Edinburgh contracted.

MOVEMENT IN INDIA.

IT is rumoured that the question of transferring the management of the East India Railway to the Government of India has once more been raised, and, it is said, will be carried into effect in 1879. A report that the Board of Agency has declined to sanction any large outlay for new stations or other buildings has, however, been contradicted.

A grand scheme for the system of canals through Eastern and North-Eastern Bengal has been started. By this means a large portion of the Soonderbuns would be drained, other districts would be supplied with fresh water, while the accommodation for local traffic would be greatly increased. The great cost of any such project renders its execution extremely problematical.

The Punjab Government has sanctioned an expenditure of about 70,000*l.* in improving the water-supply of the city of Lahore, and an annual expenditure of 2,000*l.* for maintaining the new arrangements in proper working order.

The consulting architect of the Tanjore district has been directed to place himself in communication with the Surgeon-General and the Sanitary Commissioner, with a view to preparing and submitting to Government sketch-plans of the Mofussil Dispensaries.

Among the public works just finished in Madras are new Government stores and workshops, and those at present in existence are to be converted into a military hospital. Quarters for the lady nurses have been erected at the General Hospital, at a cost of Rs. 26,162, and a new palace is in course of construction for the Prince of Arcot, which will involve an outlay of 11,000*l.* or 12,000*l.* The zenana has been finished, but the palace-grounds have still to be enclosed, and the durbar-hall has to be furnished.

A movement is on foot to provide a suitable memorial of those who have fallen at Perak, which, if sufficient subscriptions are forthcoming, will take the form of a stained-glass window, in St. George's Church, Penang.

The Station Church of Lahore is about to be restored, pending the building of a new one, which is much needed. The Mahommedans of the city are also collecting subscriptions for the restoration of the Jaina Musjid, and have already gathered over 2,000*l.* for the purpose.

The trustees of the Indian Museum have lately purchased Dr. Dey's large collection of Indian fishes. They are also negotiating for the purchase of the late Mr. W. S. Atkinson's collection of Indian insects. It fills twenty-five large cases, and is particularly rich in Darjeeling *lepidoptera*.

The death is announced of Mr. James May, C.E., resident engineer of the Madras Harbour Works. He had had considerable experience in this style of construction, having previously been engaged upon the harbour works at Kurrachee, Alderney, and Alexandria. The local Government has telegraphed to send a successor at once.

The French in India are in luck. A native named Soobroya Pillay has left the Pondicherry Government 30,000*l.* by his will, and it is proposed to establish a school of Industrial Arts with the money. There are, it appears, a number of young men, European, East Indian, and native, going about in the French colony without employ, not having the means of earning an honest livelihood, and it is hoped that if such a school were established they would, by learning a useful trade, cease to be a burden on society.

The Government of Bengal have had under consideration projects for the formation of a similar school or workshop for the practical instruction of the passed students of the Civil Engineering classes of the Presidency College; but the expense attending the foundation of a separate institution for this purpose, and the difficulties in organising it, have delayed the introduction of the scheme.

The re-organisation of the Madras Department of Public works is said to be again on the *tapis*. An officer from Bengal recently visited the Presidency, and is said to have drawn up a memorandum tending to show that the whole department is far behind the age, and that it must be thoroughly reconstituted on the Bengal model throughout.

Great efforts are being made to push on with the new water-works for the supply of Bangalore, under the control of Mr. W. Henderson, C.E. The project is intended for the collection of the storage of the rainfall on a comparatively high portion of land north-west of the station, and it is estimated that the total cost will be about 70,000*l.*

The native state of Mysore has provided 83,300*l.* for the restoration of tanks, and 30,000*l.* for new roads, in its estimates for the present year. The total estimated revenue is only about a million sterling.

The Forest Department, Burmah, have recently been extracting crude turpentine from two kinds of pine trees—the Musonia and the Khasyana,—which are found growing abundantly on the Salween hills, and there is some talk of making the product an article of commerce.

The King of Burmah has signed a contract with a Venetian gentleman for the construction of a railway from Mandalay to the British frontier, and Italian capitalists are said to have subscribed the necessary capital. The line is to be completed within six years and a half from the present time, and is to be handed over to the king whenever he is prepared to pay its cost with a fair profit added. Until then it will be worked by the company, 12 per cent. profit yearly being guaranteed by his Majesty.

A selection from the Yusufzya sculptures, weighing about twenty-two tons, has been despatched to England by the Duke of Argyll. It comprises statues, pillars, and carvings of sacred subjects, &c., together with the whole of the carved facings of the steps discovered at Jawalgiri, representing various "*Jatakas*."

General Cunningham has found two *dated* inscriptions of Asoka, one "when years after the Nirvana of Bhagavat had been fulfilled," only, unfortunately, the middle figure in both is doubtful. The first and the last are, however, almost certainly two and six.

Dr. Buhler has discovered the Sanskrit school, erected by Raja Dhar in the centre of an old mosque, and forming an integral part of the mosque. On one pillar are the Sanskrit conjugations; on another, opposite, the Sanskrit declensions. Round about are quaint punning Sanskrit slokas, in praise of Raja Dhar. The rest of the mosque is built of pillars, &c., taken from ruined temples.

While the archæological surveys of Bengal and Bombay are being carried out by General Cunningham and Mr. Burgess, very little has been done for Madras. A lengthy correspondence has taken place on the subject between the Madras and the Supreme Governments, and an offer has been made from the India Office of a salary and travelling allowances for a surveyor; but the sum mentioned is so very small that there is no immediate prospect of any competent person being tempted to undertake the duty.

The Conservator of Forests in the Tenasserim Provinces has published a return of the number of teak logs of all descriptions that have been imported into Moulmein from the Shan and Karenne States, as also the number of logs which have been brought into the market from our own forests. The whole quantity in the seventeen years, 1859—76, only comes to 237,305 pieces of timber. In 1859-60 only 52,955 logs of all sorts came to Kadoe, the timber station; from that year till 1866-67 the number ranged from about 64,000 up to 95,000. In 1869-70, the supply fell as low as 44,362. During the year 1875-76 no fewer than 138,609 logs came down.

The municipality of Lahore has unanimously resolved that plans for the introduction of a pure water supply and the drainage of the city and suburbs, prepared by Mr. Leslie Clark, C.E., together with an application for a loan of 135,000*l.* to carry out the works, be submitted for the sanction of the Government.

Among the many memorials which it is proposed at present to raise in India, is a little one which it is to be hoped will not escape notice among its more pretentious neighbours,—viz., a small monument over the grave of Captain Butler, of Naga Hills celebrity, at Golaghat; and, if a balance should remain, something towards perpetuating his memory in England.

Recent excavations at a place called Mahetshet, near the city of Bulrampore, have brought to light a number of interesting remains of Buddhist temples, and it is now intended to erect a museum for their reception at Gonda, in Bengal.

Factories for the manufacture of small arm ammunition are about to be established in each of the three presidencies of India. Machinery of the latest pattern has been manufactured for the purpose, and lies at Woolwich Arsenal ready for exportation.

Sir Richard Temple, who rarely mounts a hobby without winning the race, has declared himself strongly in favour of establishing a hospital for incurables in the neighbourhood of Calcutta. There is not money enough for this new project just at present; but a modest little house has been converted to this purpose as a temporary hospital at Sealdah.

A translation of the "Coppa Sasana," recently placed in the Mysore Museum, has been made by Mr. Rice, the Director of Public Instruction in Mysore. It is dated A.D. 481, and is written in Old Canarese characters; but the language is Sanskrit. It describes the Chora line of kings, whose capital was Talkad (now a deserted city in the Nugur Division of Mysore), and who ruled over the whole of the south of that province from the beginning of the Christian era to the end of the ninth century, or for about 1,000 years. One plate of the Sasana is wanting, and the east side of one plate is illegible; but the remaining plates are in an excellent state of preservation.

ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS.

THE third annual meeting of this Association was held on the 6th and 7th inst., in the hall of the Institution of Civil Engineers, Great George-street, Mr. James Lemon, president, in the chair. The first day's proceedings were devoted principally to purely business matters concerning the Association, such as the consideration of the annual report (which showed the society to be flourishing), alteration of rules, and the report of the council upon the election of officers, &c.

Mr. Lemon, after thanking the Association for electing him their president, proceeded to remark that sanitary engineering was of comparatively modern growth, as it might be said to have sprung into existence less than thirty years ago, when the investigations of Mr. Edwin Chadwick and Dr. Southwood Smith into the causes of zymotic disease led to the passing of the Towns Improvement Act of 1847, and the Public Health Act of 1848, which were followed by a host of Sanitary Acts down to the present time. The adoption of the Public Health Act of 1848 necessitated the appointment of surveyors; but though some appointed at that time were gentlemen of ability, the large majority necessarily possessed but a limited knowlege of sanitary science. The demand thus created for special knowledge naturally induced civil engineers and surveyors to devote themselves exclusively to the study of this important branch of the profession, and the result had been the creation of the sanitary engineer. But it was reserved to that Association to take legitimate steps to bring together the official talent of the country, and to adopt means of instruction whereby the standard of knowledge of sanitary science amongst its members might be permanently raised. This brought him to the present position of towns and districts under the Public Health Acts, and the duties of their officers. The first duty of the sanitary authority was the removal of excremental matters, which brought into play the constructive skill of the sanitary engineer, and the chemical knowledge of the medical officer of health. It was satisfactory to know that great differences of opinion now no longer existed on the sewage question, and that there was a healthy tone of general accordance on main points, which augured well for the settlement of the most difficult problem in sanitary science. The more we studied the subject, the more we became convinced that the choice of the system must depend entirely upon local circumstances. Closely allied with town drainage was the disposal of sewage at the outlet, and in this particular all towns were in the same difficulty. Sewage utilisation or purification had been the subject of much controversy, and large sums of money had been expended in the attempts to solve the problem; but the advocates of irrigation, precipitation, and filtration, had come to the conclusion that sewage utilisation did not pay, that the attempts to make a profit out of sewage must be given up, and that it must be treated as something to be got rid of without nuisance. Local Boards must either pay a subsidy to public companies, or they must make an annual loss if they elect to do the work themselves. In either case there must be a charge upon the rates. If the sewage outlet is above the intake of the water supply of another town, then the best means of purification is to apply the sewage to the land. If this condition does not exist, then precipitation or filtration may be resorted to; but in every case the standard of purity of the effluent water should not be lower than that of the river into which it is discharged. There are many details connected with the drainage of a town to which the attention of this Association should be specially directed, with the view of acquiring by discussion a better knowledge of the subject, and more uniformity in working. Among the many subjects upon which he hoped to hear papers read and statistics given were,—(1) sewage pumping machinery; (2) the separate system; (3) the area of land for irrigation and intermittent filtration per 1,000 gallons of sewage, exclusive of rainfall; (4) the drainage of sewage farms, the formation of the land, and the cost per acre; (5) the cost of precipitation by various processes, and the cost of drying the sludge. At the late Conference at the Society of Arts, strong opinions were expressed in reference to the defective condition of house drainage, and as to the desirability of the work being done by the local authority. This was, in many cases, correct; but we must avoid paternal government in these matters. Local Boards have ample powers to enforce the construction of efficient drainage, but this can only be done by an increased staff of inspectors, involving increased annual expenditure. Whether the inspection of buildings should be paid for by fees, as in the metropolis, was a matter for serious consideration. The Government, as they were aware, were promoting a Bill for the prevention of pollution of rivers, which on the whole was a very good measure; but he considered the 8th clause defective, as it would give encouragement to manufacturers to carry liquids into the sewers, to the serious detriment of the purification of the sewage. The opinion of two such large towns as Wolverhampton and Birmingham might be taken as evidence of the desirability of excluding such refuse from the sewers on any condition whatever, and admitting only the effluent water at such a standard of purity as should be approved by the local authority, with power of appeal, in case of dispute, to the Local Government Board. The next subject to which he would allude was that of water supply. The importance of good water could not be over-estimated. All towns which are without this vital necessity have a high rate of mortality, and a heavy percentage of zymotic disease. Local authorities who take no steps to prevent their constituents from being poisoned by bad water should be held responsible for such neglect, and the Local Government Board should compel such local authorities to provide a constant supply, of a fixed standard of purity, within such time as they might direct. The central authority very properly compel Local Boards to drain their districts, injunctions are easily obtained against the pollution of rivers, and the Government have a Bill before the Commons giving them increased powers; but the supply of one of the necessaries of life is left to chance and the voluntary efforts of water companies. Towns should not be left to the tender mercies of public companies, whose chief desire is to keep up their dividends; but the water supply should be in the hands of the local authority, and an analysis should be made by an independent officer under the central authority at least once a year. The influence of this Association had already made itself felt, and last year they succeeded in getting a useful addition to the clause in the Public Health Act in respect of the compulsory supply of water. Further amendment was, however, necessary. Powers are given to the local authority to compel the owners to supply water to their houses at an expense not exceeding the water-rate of the Local Act. But corporations who have constructed their own works are still liable to the limitation of 2d. per week, unless they apply to the Local Government Board. This absurd regulation was no doubt intended to protect the poorer classes, but it is not the occupier who is the objector; it is the owner, who wishes to avoid the expense of laying on water from the main to his houses. Parliament would, he thought, act wisely if they encouraged the acquisition of water-works by corporations, on the basis of annuities equal to the maximum dividends, and not upon the more prevalent system of so many years' purchase upon the dividends or profits. Corporations might also be allowed to hold shares in waterworks by consent of the Local Government Board, by which means they would gradually become the entire owners of the property. The question of water supply naturally brought him to the consideration of public baths and washhouses. The Act passed to encourage the establishment of these, like all permissive legislation, had failed to accomplish the object for which it was designed.

Very few towns have adopted it, from the fear of increased local taxation. In these days of active legislation for the working classes, and for the promotion of temperance, sanitarians should not overlook cleanliness and home comforts. The Artisans' Dwellings Act was a step in the right direction; but public baths and washhouses should form part of the scheme. If local authorities could see their way to adopt this Act without loss, they would be induced to do so, and it was the duty of that Association to endeavour to solve the problem. Amongst the many duties of the local surveyor there were none requiring more close attention than those in connexion with the maintenance of the public highways. The importance of carefully-prepared statistics as to the cost of maintenance could not be overestimated. The cost must depend upon local circumstances; but still there were so many conditions in common in all towns that much valuable information could be mutually afforded. Whatever opinions they might have as to the best material for our roads, there could not be a question as to the suitability of asphalte for public footways; but in selecting asphalte, his experience taught him that the best description was the cheapest. He had a preference for the compressed asphalte, as nothing but the genuine rock was used. The cost of new streets should fall upon the freeholder, and not upon the small leaseholder, as he reaped a very large profit by the transfer of his property from agricultural to building land. He had long been of opinion that the incidence of taxation in towns required adjustment, and that the cost of permanent works should be paid by the owner, and the maintenance by the occupier, with power to the leaseholder to deduct the proportion of the rating from the ground-rent, the same as property tax. But as taxation and representation should go together, he would give a vote to the owners in boroughs for the election of members of the Town Council. This would bring about greater interest in local matters on the part of the upper classes. They had lately received an addition to their sanitary legislation which would put local self-government on its trial. He alluded to the Artisans' Dwellings Act of last year. The difficulty which he saw in putting the Act in force was the definition of an unhealthy area, which Clause 3 defined as an area where diseases indicating a generally low condition of health among the population have been from time to time prevalent; and then it went on to state the causes to which these diseases may be attributed. But this was not sufficient. In his judgment, all courts and alleys wanting in light, air, ventilation, or proper conveniences, should be declared an unhealthy area, whether sickness prevailed or not. Sanitary measures, if they are to be effectual, should be preventive, and not remedial. It was, he believed, admitted that small towns required the Act as much as the large ones, and even more so. We have now rural sanitary authorities, who should take up this question and publish to the world how the agricultural labourer was lodged. This would bring out some startling revelations. The preparation of schemes, and the designing of artisans' dwellings, would fall upon the surveyor, who would also have to submit estimates of cost. This would be a work of considerable labour, and he hoped it would be met by Corporations in a liberal spirit. Expenditure and probable receipts should be set out showing the annual loss. That there would be a loss he had no doubt, and from his experience in laying out new streets he should estimate that loss at 50 per cent. at least of the whole cost. But although this loss would fall upon the rates, there would be a gain to the poorer classes living upon unhealthy areas from the decrease in their expenditure in times of sickness, and diminution of enforced absence from their daily toil. The consideration of this important measure naturally led one to reflect as to the causes which led to its passing, and the answer was, *laxity of local control over the formation of new streets and buildings*. The Artisans' Dwellings Bill would remove many evils; but how much better it would have been if the minimum width of streets and building regulations had been defined by Act of Parliament, and not left to the local authority to legislate on by means of bye-laws. Two years ago, at the annual meeting at Birmingham, he read a paper on this subject, and the general opinion was strongly in favour of a Borough Building Act in lieu of bye-laws; but as the local conditions vary considerably, an Act of this kind could not be framed to work satisfactorily without the local knowledge and assistance which an association like that alone could give. He should consider it his duty at an early day to call the Association together to discuss this question, and to prepare suggestions which he hoped would be accepted by the Local Government Board.

The president having concluded his inaugural address, the reading and discussion of papers was proceeded with. The syllabus included the following subjects:—"Street Tramways," by Mr. P. B. Coghlan; "Street Pavements as adopted in the City of Manchester," by Mr. H. Royle; "The Duplicate Mode of Town Drainage," by Mr. H. Jacob; "Constant Water Supply," by Mr. J. E. Greatorex.

In the course of Mr. Coghlan's paper, he said:—"I now come to the construction of the tramways. The introduction of steam power will, in my opinion, give the *coup de grace* to the system of using longitudinal wooden sleepers for the rails. It might be said that this is contrary to our experience on railway permanent way; but I think it is not so. In railway permanent way the block or rigid system was admirably adapted to the traffic expected at the time. It was only the greater speed of twenty and forty miles an hour that showed the necessity for a more elastic road. The jumping and hammering caused by such speeds shook the rolling stock to pieces on a perfectly rigid road, but when the speed is limited to ten or fifteen miles an hour, there is no such vertical motion in the carriage except when the rails are out of level, and except at the joint of the rail. If a perfectly rigid bearing is best for the tramway traffic which does not exceed ten or fifteen miles an hour, there is, no doubt, however, that with steam engines the average speed will be increased, and the joints of the rails laid upon longitudinal sleepers will give way much quicker than they are now seen to give way on the tramways laid on timber. I do not know that any system of permanent way is quite satisfactory, even on railways, and the same remark applies much more forcibly to tramways. In the timber system, as laid in London, Liverpool, Middlesbrough, Dublin, and other places (including part of the Leeds tramways), I think the construction is unsatisfactory, because the road is elastic; and though there are iron plates under the rails at the joints, a depression of the rail and a jolt of the car are generally to be found there, and this would be worse with an increased speed. Besides, I do not think the longitudinal sleeper properly holds the side fastenings generally used to clamp the rails to the sleeper. The alternate wet and dry so near the surface of the road must have a prejudicial effect on the timber, and particularly at the curves, where the timber has to receive vertical cuts, about 1 in. or 2 in. in depth, in order to bend it round, to correspond with the required curvation of the rail. If cross timbers could be used, I should think a satisfactory tramway might be constructed with wood, but, as long as we require the surface of the road to be paved, a difficulty will arise, on account of the impossibility of bedding the paving-stones satisfactorily where the cross timbers occur. Mr. Deacon, borough engineer, Liverpool, has designed a tramway which he considers specially adapted for towns, such as Liverpool, in which the ordinary traffic is very heavy. The advantages claimed by Mr. Deacon are, that a uniform bearing is secured for both pavement and rails, by forming a Portland cement concrete foundation beneath the whole street. The sleepers which are creosoted to the heart, rest upon the smooth surface of the concrete. The rail is of steel, and trough-shaped, and weighs rather more than 60 lb. to the yard, though the width is only 2¼ in. (the usual width being 4 in. or 4½ in.). The depth of the flange, and consequent transverse strength, are therefore exceptionally great. The top of the sleeper is formed to fit the trough shaped under side exactly. One of the objects sought has been to connect the rail with the underside of the concrete foundation in such a manner that while full advantage is taken of the rigidity of that foundation, a slight elasticity is secured by the presence of the timber sleeper. With this end in view, a cast-iron washer is bedded in the lower part of the concrete, and from this washer, a bolt is brought up 2½ in. above the concrete, and screwed with a right-handed thread, and the sleeper having first been drilled vertically, so as to admit this bolt, is placed in position. A second bolt, having an eye at its upper end, and being screwed with a left-handed thread, is connected with the lower bolt by a large right-handed nut. Through the side flanges of the rail two opposite holes are drilled, and the eye of the upper bolt having been placed between them, a three-fourth inch pin is inserted to connect them. By screwing up the nut, engaging the lower right-handed and the upper left-handed bolts, the rail is drawn down to its position, and holds the timber sleeper, which acts merely as a packing piece in position between the rail and the concrete foundation. These fastenings are placed at every 3 ft. The second object claimed was greater uniformity of the surfaces of the rails and adjoining setts. The whole of the setts, with the exception of those immediately adjoining the rails, are laid upon ½ in. of sand. The sets next to the rail are carefully picked, and if necessary dressed, and are alternate wholes and halves. The two extreme ends of the base of each rest upon the concrete. The stability of the whole pavement is further insured, and it is expected that the surface-water will be prevented from penetrating to the sand or to the sleepers, by filling the joints with a bituminous composition. With the object, on the one hand, of obtaining a larger tread for the tram-wheels, and, on the other, of reducing the inconvenience to ordinary traffic inseparable from the existence of a broad iron rail, the groove and wheel flange is placed in the middle, and thus, while the tread and life of the wheel are increased, the width of the rail is, as already stated, reduced to 3¼ in. I consider Mr. Deacon's system to be very ingenious; but I do not think a timber sleeper, 3 in. wide (even though it may be 6 in. or 7 in. deep), can possibly make a permanent job, particularly when it is cut about for fastenings and at curves. Besides, it would cost as much to tighten up these fastenings as it would to put in new fastenings on the ordinary system, and I do not see any equivalent advantage in the additional first cost. I should gladly support any scheme for reducing the width of the rail to a minimum, but I am compelled to object to the groove in the centre of the rail, because I do not see that any advantage is given sufficient to compensate for the additional haulage power required for pulling the cars on this form of rail. With the bearing surface of the wheel on one side only of the flange, the groove, to a certain extent, cleans itself, but with the bearing surface on both sides the flange wedges dirt and dust into the groove. I have formed a very favourable opinion of the plan recently submitted by Mr. Souttar to the Manchester corporation.

The first day's proceedings were concluded by a dinner at the Westminster Palace Hotel.

On the second day, Mr. Ellice-Clark, of Derby, read a paper "On the Construction and Maintenance of Highways." This was followed by a paper "On the Leeds Sewage Works," by Mr. A. W. Morant, of which the following is an abstract:—

After giving the statistics of area, population, levels, rainfall, &c., he described the steps taken by the corporation to effect the main drainage of the chief part of the borough, the sewage being conveyed to one outfall at Knostrop, about two miles and a quarter from the town-hall. When this was done an injunction to prevent the sewage being allowed to flow into the River Aire until purified was obtained by the riparian owners. The Utilisation of Sewage Committee having visited all the towns where processes for purifying sewage were being tried, finally decided to adopt that of the Native Guano or A B C Company. In 1870 they entered into a contract with that company, and first constructed experimental works, and afterwards permanent works, sufficiently large to deal with the whole sewage of the borough. The length of sewers in Leeds is about 130 miles, and the cost has been 283,266*l*. Mr. Morant then fully described both the experimental and permanent works, the cost of which has been 57,543*l*. The quantity of water supplied to the town from the waterworks is about 7¼ millions of gallons per day, and the quantity of sewage flowing to the outfall has been found lately, by careful gauging, taken in perfectly dry weather, to be about 9 millions of gallons. It had been considered to be much more. There are about 8,500 water-closets. The outfall works consist of pumping machinery (as the whole of the sewage has to be lifted about 18 feet), machinery for grinding and mixing the ingredients used for purification, twelve depositing-tanks, and a shallow reservoir of about five acres in area. Various processes have been tried for the purification of the sewage, chiefly those of Rupert Goodall, the Native Guano Company, and John Hanson. Each gives a good result, and it has not yet been finally determined which to

adopt. In order to compare the efficiency of these processes, Mr. Morant described the materials used, and the cost, and then showed the analyses of the effluent water and of the sludge. The sludge removed from the tanks, after being dried so far as possible in the air, is made into a powdered manure by means of Borwick's patent drying cylinders, which are found to answer well.

Mr. E. Buckham, of Ipswich, then read a paper on "The Removal of Excrementitious Matter in Towns in Connexion with Sewage Disposal," in which he stated that it was in contemplation to use Morrell's earth-closets at Ipswich instead of carrying out drainage works, which, from the nature of the ground, would be very difficult and costly.

Mr. T. W. Grindle, of Hertford, followed with a paper on "The Cost and Construction of Sewage Tanks," which we give elsewhere.

In the discussion which followed the reading of these papers, the "pail system," as in use at Rochdale and elsewhere, was very strongly condemned by almost every speaker. Reference was made to the recent Sewage Conference at the Society of Arts, it being remarked that the conclusions which had been arrived at by that gathering were devoid of anything like novelty. The principles laid down in the recommendations of that Conference were substantially if not identically the same as those which had been all along insisted on by the Association, and it did not seem likely that much good would result from outside conferences on the subject. It was generally admitted that where the contour of the land allowed of it, irrigation was the best means of disposing of sewage; and next to that, underground intermittent filtration. It was further observed in this connexion that the towns to which one or other of these systems could not be applied were very few indeed. A suggestion of some interest was made by Mr. Lynde (Manchester) on the subject of sewage-tanks. He proposed that instead of the ordinary oblong form, they should be made somewhat in the shape of a wedge, or perhaps in the shape of a fan when about half opened. The sewage was to be admitted at the narrow end, which would be deep, and drawn off in a thin film at the broad end, which should be very shallow, the bottom of the tank sloping upwards as it spread outwards from the narrow to the broad end. Mr. Lynde was of opinion that this form of tank would allow of a much speedier subsidence of the solids, and would result in a purer effluent. Mr. Grindle said he had to make another tank for purposes of experiment, and he was half inclined to adopt Mr. Lynde's suggestion. As to the various chemical precipitating processes of treating sewage, it was pointed out that their great defect was that they largely increased the amount of sludge. Hardly one of these processes was to be preferred to another, and inasmuch as lime formed the basis of nearly all of them, it would generally be found much cheaper, and almost, if not quite as effectual, to use lime only. Mr. Lewis Angell and other speakers, in referring to the pail system as adopted at Manchester, said that any one in the vicinity of the "sanitary depôt" where the pails were taken to be emptied would not need to inquire the way to it; his olfactory nerves would prove an unerring guide. The smell was something horrible, and yet, it would hardly be credited, opposite to this depôt of filth were the splendid new abattoirs erected by the Manchester Corporation, and on the side nearest the depôt the carcasses were hung, when fresh killed, for a day or two, previously to being sent all over the city and the surrounding districts. In face of what Professor Tyndall and others had said as to the "germ theory," a more effectual mode of spreading disease than placing these two establishments together could hardly be conceived. It was a gross blunder, due, he believed, to the different Corporation committees working in ignorance of what other commmittees were doing. The "sanitary depôt" would, he heard, soon be removed, and the sooner the better, for such a state of things ought not to be tolerated a day longer than necessary. In reference to Ipswich, most of the speakers deprecated the dry-earth system proposed to be introduced by Mr. Buckham, and advocated the construction of low level sewers discharging into or near the sea. The sewage of seaport towns generally would be best disposed of by pouring it into the sea, subject to such arrangements as would preclude its being carried back to the shore.

The foregoing summary of the discussion presents the salient points touched upon by the speakers. We may publish abstracts of some of the other papers read, but the Association seems to be inclined towards the short-sighted policy of giving scant facilities to the representatives of the press.

The Association now numbers 180 members, and an augmentation is expected to result from the establishment of a district branch or section for Bristol and the neighbourhood.

THE COST AND CONSTRUCTION OF SEWAGE TANKS.*

IT generally occurs that works for precipitation are in low-lying situations, the difference of level between inlet and outlet regulating the depth of the tanks, if advantage is to be taken of gravitation as a means of emptying. The size of the tanks depends upon the process adopted. Where rapid coagulation takes place, as in the phosphate sewage, "A B C" or M. Hillé's process, smaller tanks are requisite. In Hertford, where the lime process was in operation, the size of the tanks (six in number) was 120 ft. long, 20 ft. wide, and 4 ft. 6 in. deep, each having a capacity of 67,500 gallons, the tanks being always in use.

Under the phosphate sewage process, four of these tanks are found amply sufficient, while the fifth is being cleansed of sludge, and the sixth kept in readiness for storm water.

A series of narrow tanks is found preferable to two wider ones.

The division-walls are two bricks and a half in thickness; outer walls, two bricks. The rule adopted to ascertain dimensions of the division-wall is obtained by taking the weight of material used in the construction of the walls, which should be of sufficient weight to resist the pressure of water thrown against them at the maximum height.

All walls should, of course, be perpendicular, so that the solids will more readily fall to the bottom of the tank. In one case, where the brickwork was perfectly dry, I had the interior of the tank *tarred*. This prevented the growth of sewage fungi.

Tanks containing sewage should always, if practicable, be covered.

Near the entrance to the tanks, a junction with a sumph common to all of them is made, into which the sludge is swept, to be lifted to the drying-beds by the elevators. It frequently happens that there is not sufficient admixture of the chemicals with the sewage, to induce which an agitator was designed, consisting of a rectangular chamber at the sewer-mouth, with boards placed alternately at the top and bottom of the tank, at equal distances apart; this causes agitation, and answers admirably.

The cost of constructing sewage-tanks varies with the locality, so that no reliable estimate can be given. At Hertford, the brickwork cost 14*l.* a rod; Ponder's End, 20*l.*; Buckhurst Hill, 17*l.* 10*s.*; at Hatfield, only 12*l.* 10*s.* At Ponder's End, 16*s.* a cube yard was paid for concrete; at Hatfield, only 10*s.* 6*d.*; but in the former case, cement was 2*s.* 6*d.* per bushel, in the latter only 1*s.* 9*d.*

The elevating machinery should be of the simplest description, that it may be worked by unskilled labour, the only kind that can be obtained to conduct operations on sewage works. The sludge should be elevated by the common dredge (chain and bucket). Pumps are cut by the silt in the sludge.

The speaker at some length then referred to sewage filtration, observing that he found granulated coke to make the best filter or strainer, arresting those particles of sewage that are not acted upon by any known precipitant, and which, if escaping into streams, get attached to the sides or bottom, and, though uninjurious, give the appearance of extreme sewage pollution. Before concluding, he remarked that a saving of steam-power in many cases can be made by utilising the outfall of the effluent water. At Hertford, a fall of only 3 ft., with 700 gallons per minute, is found sufficient to drive the whole of the chemical machinery and sludge-elevators.

The paper was illustrated by several drawings of works constructed by Mr. Grindle.

The following is the rule referred to as to strength of division walls.

In estimating the pressure of the water to be resisted, and the requisite strength of the division wall or partition, the following calculations may be used:—

* By Mr. T. Wilson Grindle, Borough Engineer, Hertford.

P = the pressure of the water in pounds to be resisted.

d = the depth of water = 5 ft.

Taking 62·5 lb. as the weight of a cubic foot of water,—

$$P = \frac{62{\cdot}5d^2}{2} = \frac{125d^2}{4} = 781{\cdot}2 \text{ lb. per lineal foot of wall.}$$

M = the moment of water tending to overthrow wall $= P \times \frac{d}{3}$

$$\therefore M = \frac{125d^2}{4} \times \frac{d}{3} = \frac{125d^2}{12} = 1{,}302 \text{ lb.} \quad \ldots\ldots\ldots(2)$$

Let w = the weight of a cubic foot of the wall, which may be taken at 105 lb. for brickwork.

h = the height of the wall above the invert = 5 ft.

t = the thickness of the wall, 2 ft. 3 in.

D = the moment of the wall to resist overthrow.

$$\therefore D = \frac{ht^2w}{2} = 1{,}328{\cdot}95 \text{ lb.} \quad \ldots\ldots\ldots(3)$$

For safety D should exceed M.

MORTUARY FOR THE PARISH OF CLERKENWELL.

THE parish of Clerkenwell has for many years past been unable to provide a proper mortuary, consequent upon the difficulty of obtaining a site for the building. The Marquis of Northampton has, however, come to the rescue by granting the use of a portion of the now disused Spa Fields Burial Ground for the purpose for a term. It is the intention of the Marquis to hereafter lay out the whole of the burial-ground as a garden for the recreation of the inhabitants, and consequently it was desirable that the new building should be somewhat more ornamental than is usual with such structures.

The Vestry have instructed Mr. H. Saxon Snell to design for them a building that should be as complete in all its details as possible, desiring that whilst the strictest economy should be observed, everything should be done that sanitary knowledge could suggest for rendering the place unobjectionable to the inhabitants. The site is about 36 ft. wide and 130 ft. long, and it is situated to the south of the entrance to the burial-ground from Fletcher's-row, and abuts upon the back portion of the houses in Northampton-row.

There are two dead-houses, each 24 ft. long and 12 ft. wide, and a "post mortem" room, 18 ft. long and 15 ft. wide. The walls of all these rooms for 6 ft. in height are lined with Cliff's white glazed bricks; the floors are of asphalte, the coffin tables are of planed slate, and there is every facility for well flushing and cleansing all parts with water. The inquest-room is 22 ft. long, and 17 ft. wide, and the waiting-room for witnesses adjoining is 18 ft. long and 15 ft. wide. There is a separate lavatory and water-closet accommodation for the coroner and jury and for witnesses. The walls of these inquest and waiting rooms are lined with Cliff's buff-coloured glazed bricks and red skirtings.

An important feature in the plan of the building is the verandah, which affords covered access for the coroner and jury to the dead houses when it is necessary to view a body.

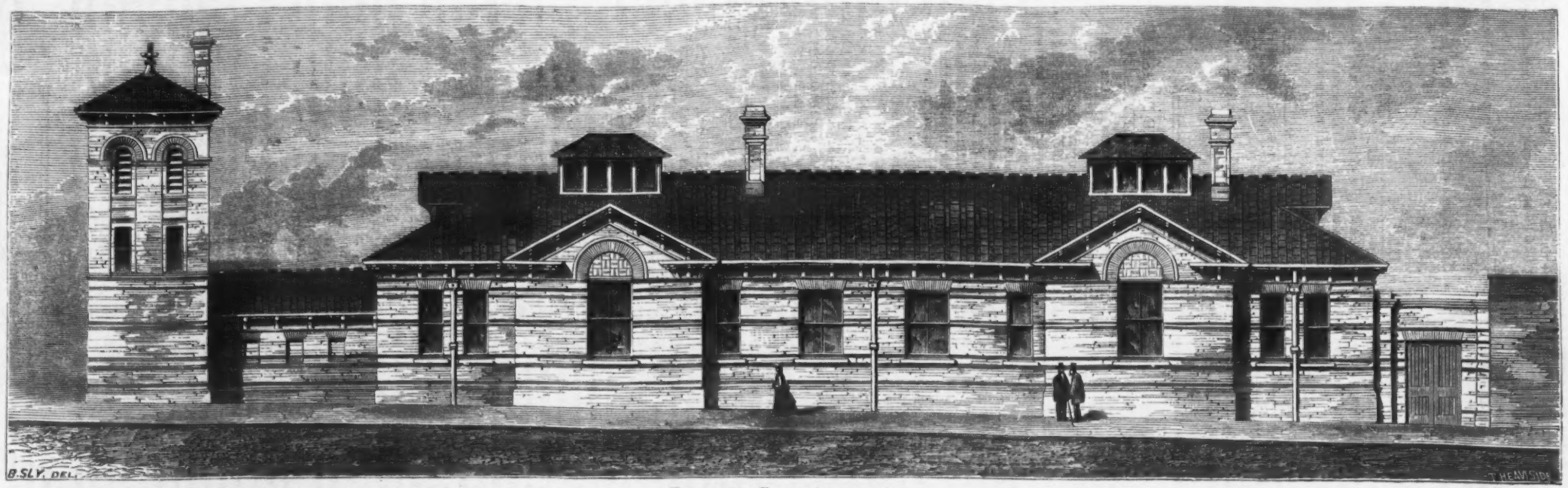
At the north-east corner of the ground is a disinfecting chamber, fitted with Messrs. Fraser's patent aparatus, and over this rises the tower and chimney shaft, with flue for carrying off the offensive odours of the disinfecting closet below. The upper part of this tower contains the cistern, and below is a room for the caretaker.

The roads, yards, and floors are all to be covered with Claridge's asphalte.

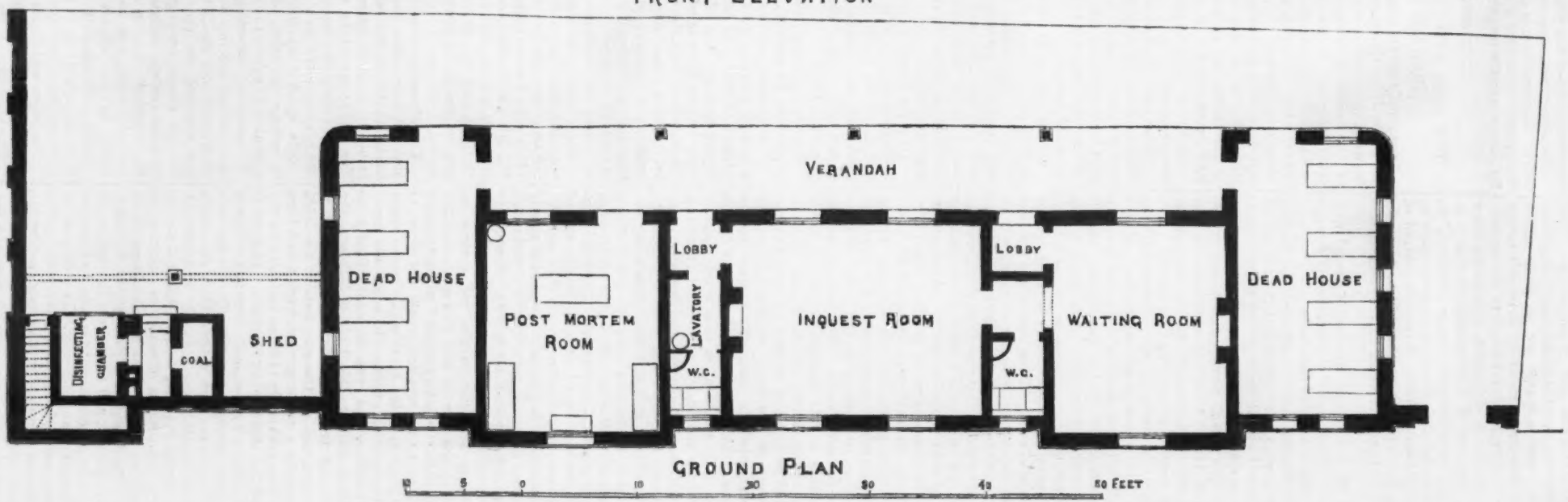
The present entrance from Fletcher's-row can only be reached by foot-passengers; but houses have been purchased in Northampton-road, and arrangements are being made for forming therefrom an entrance for hearses and other vehicles.

The builder, Mr. Patten, has undertaken to complete the whole of the work, including fittings of every description and gas and water, for the sum of 2,260*l.* Mr. Herbert, the clerk of works, superintends the erection of the building under the direction of the architect, Mr. H. Saxon Snell.

Loan Collection of Scientific Apparatus, South Kensington Museum.—Explanations of apparatus in action, lectures, and so forth, are still going on. Programmes should be looked at.



FRONT ELEVATION



MORTUARY FOR THE PARISH OF CLERKENWELL.—Mr. H. Saxon Snell, Architect.

THE NEW TOWNHALL, PHILADELPHIA, U.S.—MR. JOHN M'ARTHUR, ARCHITECT.

THE NEW TOWN HALL OF PHILADELPHIA.

VISITORS to the Centennial Exhibition will find occasion for admiring Philadelphia as one of the handsomest of cities. The buildings of the city, as is well known, bear favourable comparison with those of the Old World; and it is to be regretted that the edifice forming the subject of one of our illustrations could not be finished by the 4th of July. Philadelphia is building herself at the present time her town-hall, after the designs of the architect, Mr. John McArthur, and under the supervision of a German, Herr F. Loenholdt, of Frankfurt. The building, of ambitious design, is placed on a plot of ground 1,000 ft. square, situate at the crossing of two wide thoroughfares,—Broad-street and Market-street,—and covers, not reckoning the courtyard, a space of 4½ acres. The north and south façades measure 470 ft., those of the east and west 486 ft. 6 in. The four fronts are treated in a similar style; the centre of each is formed by a pavilion 90 ft. broad, and rising 200 ft. Gate-ways, 18 ft. broad and 36 ft. high, form the principal entrances, and at the same time passages leading to Market and Broad streets. The outside of the substructure is of fine white granite, and forms a firm basis for the colossal superstructure. The granite alone for its construction costs $550,000. The rooms of the principal story over the basement have a height of 36 ft.; over this is a second story, 31 ft. high, and a garret story, 30 ft. high. The whole façade over the granite structure is of white Massachusetts marble, with elaborate details. The marble used for it cost $5,800,000. The building surrounds a courtyard of 200 ft. square, on the north side of which rises an imposing tower. Its foundation is concrete; its walls are 20 ft. thick, and formed of blocks of stone weighing from 2 tons to 5 tons each. The tower measures at its foot 90 ft. square, and tapers to an octagon bearing a cupola, surmounted by a statue, 35 ft. high, of William Penn. Altogether, the tower will have a height of 510 ft., and will consequently be the highest in the New World. The whole building numbers 520 rooms. Four great lifts lead to the different stories, communication throughout the building being, besides, made easy by all possible means.

THE ETHICS OF TASTE.

GOOD taste is in reality a matter of deeper significance than may at first sight appear; it is, indeed, a matter of principle affecting the mind and character, an essential element towards the formation of excellence.

In the construction of a building it is not sufficient that the material employed is sound, and the workmanship good; something more than mere utility is required to satisfy the demands of good taste,—the material must also be arranged and adjusted in a pleasing and artistic form. The material must be good, the workmanship good, the form good; a deficiency in any of these respects detracts from the good taste of any work of man.

Shabbiness is one of the most contemptible of qualities, and indicates a certain narrowness and meanness of mind which displays itself in the effort to do things by halves, and to make things appear better than they are. The love of display which results in vulgar ostentation is the result of selfishness, of a desire to excite the envy of others rather than the wish to share benefits with them,—an effort to appear great, without striving to be great in reality. The works of a man are not to be estimated by their intrinsic value only: the richest material may, by great labour, be tortured into the most repulsive form, but it does not gain in value thereby, whereas material which in its natural condition may be of trifling value, may, under proper treatment guided by good taste, be made to assume a form which renders it of priceless value.

Profuseness of ornament unregulated by good taste is the counterpart of extravagance. The separate items may each be good of their kind, but too much of a good thing is destructive alike to mind and body. Misapplied wealth is more dangerous than poverty. Ornament rightly applied should help the design, not overlay and obscure the form; it must be applied with discretion and forethought, not profusely and at haphazard. Eloquence does not consist of loud talk and extravagant gesticulation; however high-sounding the words, unless they convey ideas, they are worse than useless,—an annoyance and source of weariness and disgust to those upon whom they are inflicted.

An illusion prevails, even amongst people of intelligence, that good taste is intuitive, and does not require study or thought. The germ of good taste must doubtless exist in the mind before, and can be cultivated, but, like every other mental quality, it must be trained and carefully nurtured if it is to be productive of good results. The people of this country are generally in a condition of simple ignorance in relation to the fine arts. The benefit to be derived from the study of art seems vague and illusory to those whose artistic instincts are weak; they cannot see that a careful study of works of art is worth the trouble,—that any benefit to be gained thereby is worth striving for unless it be the sordid one.

The eye must be pleased and the sense of beauty gratified wherever man is raised above the lowest stage of barbarism, and this sense of beauty will be displayed in every direction if it is real and genuine, and not affected and superficial. Common sense is often lugged in as an excuse for the neglect of art; the absence of good taste in the exterior of a house is spoken of as a merit, and an appeal is made to the alleged fact that it is perfect within. But upon analysing this alleged perfection, it is found to consist of common-place elements, and that neither art nor good taste is amongst them. We have heard a man boast that his garden would compare with any he had ever seen, but take merit to himself for having built an ugly house in the midst of it. "The house was built to live in, sir,—not to look at." The absurdity of this is surely obvious. Need the house of necessity have been ugly in order to be a comfortable residence? Did the ugliness of the house add to the beauty of the garden? or was the good taste (if there was such, which is questionable) displayed in the one a complete compensation for its absence in the other? An ugly object in the midst of a beautiful one is certainly out of place. An idea seems to have taken possession of some minds that an artistically-designed house must be a gimcrack affair. "A plain, square, substantial house" is talked of as the acme of perfection, as if a house of that description must necessarily be substantial, and one of a more artistic description flimsy. The much-boasted-of common sense, if it really existed, would suffice to destroy this illusion. Beauty of form is not incompatible with usefulness, but, on the contrary, true beauty is an essential element of genuine usefulness. An ugly object may be useful, but it would certainly be more useful if of good form. Superadded ornament is not by any means essential to beauty, but good proportion is; a well-proportioned object is always beautiful, although unadorned by detail. Manufactured articles which are cast from a mould, for example, vary considerably in appearance, although they bear a decided resemblance to each other; but the sharpest casting is the best in quality as well as the most beautiful in appearance. The workmanship of a skilled hand, again, is superior to that produced by a mechanical operation; superfluities are got rid of, and imperfections carefully avoided, and variety and effect are produced which cannot be attained by the use of unintelligent mechanism. Thus it is that the skilled hand is called in to overhaul and remedy the defects left by the machine, and to make the object more beautiful and useful.

There are men so constituted that they cannot comfortably hold an independent position; they lean for support upon authority, and that too often without any attempt to inquire into the right of the authority to the position held. There are doubtless many so weak and ignorant in regard to certain matters that they never go safely unless in leading-strings, and it is well that they should be safely guarded, but it is requisite that the guides should be trustworthy and capable. In matters of taste there are men who adopt the character of guides, who act without authority and without sufficient knowledge of the position. They have no fixed object in view, but are swayed by every change in the wind of fashion. At one time they point to a newly-opened and distant land as the only place worth looking at, and at another they say you need not go beyond the next street in order to see what is really beautiful. These beauties they never discovered till other men of keener perceptions pointed out that something good was to be found in that direction, and forthwith they declare that everything there is admirable. These men are not devoid of knowledge, but "a sane mind does not always escape an epidemic folly any more than a sound body escapes an epidemic disease."

"To understand and to perform are two very different things." There are "mute inglorious Miltons," who feel the afflatus stir their souls, but the power of expression is denied them; a seal is upon their lips which forbids utterance; they see clearly the object of their admiration, but have not the power to grasp it. The man who feels thus, who understands but knows he cannot perform, is certain to place himself under proper guidance if left to his own choice,—he employs one who can extract poetry from form, and is rewarded by becoming the possessor of an admirable work of art.

It is a comparatively recent discovery that no inconsiderable number of people are colour blind, and it is a remarkable fact that it is very difficult to convince them that they are so. Not only is this the case, but there are others who do not labour under this defect, but who, from not having cultivated the eye, do not perceive the existence of certain colours, and cannot distinguish a variety of tints. The instructed eye of the artist who sits down to sketch a landscape perceives numerous tints on a grass field where the uninstructed eye sees only one or probably two. So, too, much that is beautiful, both in mind and manner, is unperceived by those of grosser nature, they are unable to discern the delicate refinement and sensibility which cause the finer natures to shrink from all that is base and unlovely.

There is a consistency in Nature which applies to the noblest work of the Creator, the mind, the soul of man. The *suaviter in modo* and the *fortiter in re* must be combined where there is good taste; good taste is ordinarily allied with generosity and manliness of character and amiability and gracefulness of manner. And what are these but the outward expression of that charity, without which we are nothing worth,—the chief item in the formation of "the beauty of holiness"?

THE CIVIL AND MECHANICAL ENGINEERS' SOCIETY'S VISIT TO MR. D. KIRKALDY'S WORKS.

THE members and friends of this Society paid a visit to the above works, on Saturday last, by the kind permission of the proprietor.

Upwards of thirty gentlemen availed themselves of this favourable opportunity, and each, upon signing the visitors' book, was presented with a programme of the different contents of the establishment. The past-presidents of the society, who attended, and took a special interest in the visit to these testing and experimental works, were Messrs. Eachus, Mem. I.C.E.; B. Haughton, M. I. Ingénieurs Français; C. W. Whitaker, and G. W. Willcocks, Assoc. I.C.E.; and amongst other visitors and friends were Messrs. J. B. Costello, Toplis, Groves, Gill, Barfield and Humby, of the G.N.R. engineer staff; H. Valpy, Mem. I.C.E.; H. Ellis Hill, Assoc. I.C.E.; &c., &c.

The first object of interest to catch the eye in the office is the coloured drawing, by Mr. Kirkaldy, of the steamship *Persia*, which was in the Royal Academy Exhibition 1861, being the first, and as yet the only, engineering drawing admitted to that institution. It is a good specimen of draughtsmanship, and was admired by many present.

On the ground-floor are to be seen the testing-machine and its arrangements for applying the different stresses; also the great variety of tools necessary to meet the diversified requirements in testing materials; the steam-engine and boilers for working the hydraulic pumps and other machinery; three travelling cranes, for moving girders and other heavy articles; machines and instruments for accurately weighing and measuring specimens.

In the first-floor, or machine-room, there are turning-lathes; planing, shaping, slotting, and drilling machines; tools and standard gauges for accurately preparing such specimens as require it, previously to their being tested; also for making additional apparatus if required.

The second-floor is reserved for additional machinery, &c.

On the third-floor, or museum, are so many thousand broken specimens which have been tested at this establishment that it is almost impossible to enumerate them; suffice it to say there are columns of bricks, stone, and wood; bars and plates of steel, iron, and bronze; railway rails and girders; samples of cloth, canvas,

ropes, belting, &c., which have all been tested with one machine. One specimen deserves special notice: it is known by the workmen as "the man's leg," owing to its having a centre bar of wrought iron and six smaller ones of the same metal spaced round the centre, and cast into the body of the sample bar. This same bar was said, by the parties who sent it, to be tensilely strengthened by the aid of some secret mixture of chemicals,—but lo! when broken by Mr. Kirkaldy, the fraud was exposed, and there it remains to this day in the museum, and is well worthy of attention, to show the special value of testing and experimental works.

So minutely is the testing-machine registering dial divided, that it registers to less than one-hundredth of an inch, and it must have cost years of labour to bring it to its present state of perfection.

After a visit of over three hours' duration, the party broke up with passing a vote of thanks to Mr. Kirkaldy for the great trouble he had taken in personally conducting the party over his establishment.

PROPOSED BOROUGH MARKET, WAKEFIELD.

PLANS for the new general market which it is proposed to erect for the Borough of Wakefield have been decided upon. They have been prepared by Mr. W. Watson, architect, Wakefield, under whose supervision the works will be carried out. The buildings will be erected upon the oblong piece of land now occupied by a few temporary sheds, and used in part as the present market-place. It is bounded on the east by Teall-street, on the west by Brook-street, on the south by Westmoreland-street, and on the north partly by the Old Market House, and completed in a line with the same by the new buildings, extending altogether over an area of about 2,665 square yards. Around this space, and inclosing the inside market, will be forty-two shops, divided as follows, viz.: — Fourteen in Teall-street, with a frontage of about 11 ft. each, and 14 ft. deep in the clear of the walls except one, which is 14 ft. each way; there are six in Westmoreland-street, with a 12 ft. frontage, and 16 ft. deep, also two corner shops, each 14 ft. 6 in. by 19 ft., fronting respectively to Teall and Brook streets, as well as to Westmoreland-street, and having angle doorways. Eighteen shops will face Brook-street, seventeen of which will be 9 ft. by 14 ft. in the clear, and one 14 ft. by 14 ft.; this shop and one of the others will also have an open front to the inside of entrance. The enclosure will be completed by two shops in line with and abutting against the old market-house, fronting the inside market, and being 10 ft. by 14 ft. in the clear. Facilities will be arranged so that many of the shops in Brook-street may largely increase their size and accommodation by a communication between them and the inside shops, thus allowing the occupiers to carry on trade both inside and outside of the market. The "inside market" is to be approached by three entrances—one from each of the streets—two of which rise up several steps, as it is intended to make the new inside market-floor level with the present market-house, the two entrances to the same being allowed to remain. Through communication is thus given, making the entire market, both old and new, of considerable length. The interior is fitted on three sides with thirty-eight shops about 9 ft. square. Eighteen of these shops will be finished and fitted as second-class butchers' shops. In addition to these shops, there will be three rows of open stalls, occupying the centre of the market, divided into seventy-eight divisions, about 10 ft. long by 3 ft. 6 in. broad, each properly fitted up, and having a moveable dado, with lock and key, for stowage, under the stall-board. The total area of the inside market between the walls will be about 1,628 square yards, the floor of which will be covered with wood, on strong joists and sleeper walls, excepting the top part next the old market and the entrances, which will be of stone. The whole of this area will be covered in by a light iron roof in six bays of 30 ft. span, running east and west, supported on iron lattice girders in two lengths, meeting over a centre row of iron columns, with ornamental caps and bases, and semicircular spandrels springing from the same and the walls, thus forming two avenues north and south, each 34 ft. wide. Light is obtained by means of skylights on the north side of each bay to its whole length, as well as by semicircular windows in each gable, and ventilation is provided by fixed louvres at the top of the roof, also to the entire length of the bays, as well as by part of the semicircular windows being made to open and close. The general character of the buildings is Byzantine, the material being red pressed Oldham facing bricks and Huddersfield stone dressings. The principal elevation will be that to Westmoreland-street, the chief points of its architectural effect being the circular pedimented entrance in the centre, executed entirely with stone, the spandrels of which will contain a carved panel of the Wakefield arms; there will also be a carved string-course the length of this front, stopped at either end by the projecting octagon bays, which are carried up considerably higher than the other buildings by Mansard roofs. The chief features in the Brook-street and Teall-street elevations are entrances which are in the same character as that in Westmoreland-street. The shop-fronts have segmental arched head springers and key-stones, with ornamental ironwork filled in at the segments. The front wall of these shops is carried up to a parapet with a moulded stone string-course and coping.

ACTIONS AGAINST THE COMMISSIONERS OF PUBLIC WORKS.

DAMAGE TO STRUCTURE.—LIGHT AND AIR.

AT the Northumberland Summer Assizes, on the 11th inst., before Mr. Justice Lush, the following case was heard:—

Angus & Co. v. *The Commissioners of Her Majesty's Works and Public Buildings, and Dalton.*—Mr. Littler, Q.C., in opening the case, said the action was brought by the plaintiffs to recover damages for very serious injuries suffered by the destruction of their manufactory and warehouse. The premises, which were situate in Westgate-road, Newcastle, were altered in 1847 into a coach-building manufactory, and the plaintiffs carried on business there. The house adjoining the works in Westgate-road was purchased by the Commissioners of her Majesty's Works and Public Buildings, and in November last it was pulled down, in order that an office for the District Probate Registry might be erected on the site. There was no party-wall, and when the house was pulled down plaintiffs' premises became exposed to air at the side. The plaintiffs did not rely upon the walls of the defendants' house for support; their place was supported by a chimney breast which went up from the bottom to the top of the plaintiffs' premises, and into which transverse beams were tied, the other ends of the beams being tied into the opposite gable. The defendants had a right to pull down the wall adjoining plaintiffs' premises, and its pulling down was not the cause of the building falling. On November 9th, plaintiffs' solicitors (Messrs. Stanton & Atkinson) wrote to the Commissioners, and Mr. Dalton (the contractor who was carrying out the works for the Commissioners) stated that plaintiffs' premises had been exposed to the air, and stating that they did not object to the removal of the wall, and adding that they held the defendants liable for any damage they might suffer. The end of plaintiffs' premises was then boarded up by the defendants' servants. When the building was entirely removed, the site was excavated to a depth of about 11 ft.; and Mr. Dalton and the clerk of the works were warned that if they did not take care they would bring down the chimney-breast which supported plaintiffs' premises. A beam was placed in between the chimney-breast of plaintiffs' premises and Dr. Heath's house (on the opposite side of the excavation), but that made matters worse. In the beginning of this year the chimney-breast gave way, and the beams fastened into it fell, and the whole place slipped down into the excavation. Plaintiffs' premises were perfectly safe until the hole was excavated; and the fall of the premises was attributable to that excavation, and the want of proper supports by the defendants. Mr. Dalton contracted with the Commissioners to "shore up the adjoining buildings, and make good all damage that may be caused thereto by the erection of the building." Mr. Littler quoted the recently decided case of Barron *v.* Peate (Law Reports for June), and held that, under the decision in that case, the Commissioners were liable. He added that it was estimated that the damage done to plaintiffs' building was 1,350*l.*, 1,100*l.* to stock, and about 700*l.* for loss of profit, and 150*l.* for rent of another warehouse.

Witnesses having been examined,

Mr. Stephens and Mr. Herschell agreed to a verdict being given for the plaintiffs, with leave to the defendants to move on questions of law.

A verdict was given for the plaintiffs, the amount of damages to be decided by an arbitrator.

At the same Assizes, on the 12th inst., the following case came before Mr. Justice Denman:—

Clark v. *Her Majesty's Commissioners of Public Works.*—In stating the facts of the plaintiff's case, Mr. Herschell, Q.C., said the plaintiff was the owner of some property adjoining the new post-office, which had been recently built in a street called St. Nicholas's-buildings. The action was originally brought against Mr. Wetherley, contractor, who built the post-office, and her Majesty's Commissioners of Public Works, to recover damages for interference with his property,—a trespass on his property,—and an interference with the lights of his building. The trespass had, however, been settled between the contractor and the plaintiff, and therefore the action was now against her Majesty's Commissioners in respect of the interference which the new building had caused to the ancient lights of the plaintiff's building. The premises were used as a boot and shoe and clog making establishment, and were bought by the plaintiff upwards of twenty years ago. They had since been occupied by him for the purpose of his trade. The premises fronting into St. Nicholas-square were not injuriously affected by the post-office, but the back rooms were all lighted from the side, and it was in regard to these rooms that the action was brought. Between the plaintiff's building and the structure that formerly existed there, there was a passage 7 ft. square, and this building adjoining at 7 ft. was very much lower than the post-office which had now been raised on its site. The eaves of the building did not quite go up to the bottom of the windows on the second floor of Mr. Clark's house, and from that point there was a sloping roof of about 9 ft., so that the second-floor windows and the windows above had most excellent light, and, in point of fact, nothing to interfere with them. The first-floor windows also had a very considerable direct light from the atmosphere through the sloping roof of the building opposite. These rooms were used by Mr. Clark for the purpose of his business, and until the Post-office was erected, the first and second floors and attics enjoyed an excellent light, being really without any obstruction for a very long distance. The Post-office had been raised to the height of 42 ft. above the top of the plaintiff's house, and it was utterly impossible that that building could have been erected without considerably affecting the light. Plaintiff's windows were much more than twenty years old, and when a man had a window twenty years old, his adjoining neighbour had no right to build anything on his land which would cause him to have less light than previously.

Mr. Fitzjames Stephen on behalf of the defendants, said the question in the case would only be one as to the amount of damage done to plaintiff.

Mr. Herschell, resuming, said that it was perfectly settled that a person might even alter his windows as he pleased, and provided he did not put greater burden on his neighbour's land by doing so, he was still entitled to his old rights. It was at one time thought that if a man enlarged or changed the character of his windows, he lost his right to the light. That had now been decided by the House of Lords not to be the case, and therefore, in considering the damage the plaintiff had sustained, they must not only look to the condition that the place was in now. Mr. Clark was the freeholder of the building, and the question was, how much had the premises been deteriorated in value by what the defendants had done?

During a discussion, his Lordship asked if a settlement might not be come to between the parties, seeing that the point between them was in respect to the damage?

No arrangement being arrived at, the case was proceeded with. Several witnesses were called who had been in the plaintiff's employ, and spoke to the altered light. Surveyors were also called, one of whom stated that the damage to the property, &c., caused by the depreciation of the ancient light, was about 1,400*l.*

The jury found a verdict for the plaintiff for 350*l.*

GROWTH OF PECKHAM.

BUILDING ON THE GREAT DUKE OF MARLBOROUGH'S ESTATE.

THE large plot of ground lying between High-street, Peckham, and the Old Kent-road, and bounded on the north-west side by Commercial-road, and on the east side by Asylum-road, has for some time past been in the hands of the builders, and already some hundreds of houses have been erected, whilst building is still actively proceeding, large numbers of houses being at present in progress, and the locality promises shortly to form a little town in itself. A special interest attaches to this immediate neighbourhood, which is fast losing its suburban character, to be speedily covered with bricks and mortar. For several years past a portion of it has been known as Peckham Park, whilst several acres have been occupied as market gardens. It forms what formerly was the domain of the great Duke of Marlborough, when his grace resided in a mansion then standing on the estate, but which has long since disappeared from view. Marlborough-road, however, leading from the High-street to the borders of the estate, is a standing record of the past, and Goldsmith's house, at the south-west angle of the estate, which it overlooks, still remains, although it is believed that this historical residence will soon share the fate of many other old landmarks, and be removed out of existence in order to make way for what are called "modern improvements." The poet's residence, which is at the east end of Goldsmith's-road, has inscribed over the doorway "Goldsmith House." It is a quaint old white building, two stories in height, standing in its own grounds, and was occupied by the poet when he was tutor in the Duke of Marlborough's family, and is popularly believed to be the house in which the "Vicar of Wakefield" was written.

Not far from the centre of the estate a new church, dedicated to St. Jude, has just been opened. It is in the Norman style of architecture, and is built of white brick, with red brick and Bath stone dressings and facings. Four gables rise above the lean-to aisles, both on the north and south sides, and at the north-west and south-west ends there are lofty Gothic porch entrances, deeply recessed, with a smaller entrance at the south end. There is a prominent bell-turret, with a coping of stone, at the west end. Internally, the church is 120 ft. in length, and a little more than 50 ft. in width. The interior walls are faced with white cement, relieved by red brick bands, and the arches of the arcades which divide the nave from the aisles, as well as the circular window-heads, are

similarly faced. The flooring of the body of the church is of a peculiar red concrete, which has been recently patented by Messrs. Wilkinson, of Newcastle; whilst that of the chancel, which is raised several feet above the nave by a flight of six steps, is laid with encaustic tiles in varied patterns and colours. There is a clearstory, with a range of ten windows on either side, above the nave; and the church has an open ceiling in pitch pine, stained. The font at the west end is a prominent feature in the church. It consists of a solid block of pure white marble, supported upon four coloured marble columns. It is octagonal in form, and in the central panel is a representation of Christ blessing little children, sculptured by Mr. Earp, of Kennington-road, who has also executed the whole of the work. Mr. A. Blomfield is the architect, and Messrs. Adamson & Son, of Putney, are the contractors.

THE LATE LADY SELWYN, OF RICHMOND.

INAUGURATION OF A DRINKING-FOUNTAIN.

CAPTAIN HUGHES HALLETT, the husband of the late Lady Selwyn, of Selwyn Court, Richmond, has erected a drinking-fountain to the memory of his wife, who died last year, and it was inaugurated last week by Dr. Selwyn, Bishop of Lichfield, who is brother-in-law to the deceased lady. The fountain is situated in the Kew-road, not far from the Richmond railway station. It is in the form of an obelisk, and consists of a needle, in polished Cornish granite, 10 ft. 6 in. in height, mounted on a die and base, 5 ft. by 4 ft., also in granite. This rests on a double platform of two steps, also in granite. On each of the four sides of the die there is a basin of pure white Sicilian marble. The outer face of each basin is carved with acanthus-leaves, supported by shafts of polished red granite, which rest on moulded bases of the same white marble let into the large granite base. Over each basin is fixed a lioness's head, in bronze, and the water flows into the basin through a jet from the lioness's mouth. On the two plinths forming the base of the needle is engraved the inscription, as follows:—"This drinking-fountain is erected by Frank Charles Hughes Hallett, late Captain of the Royal Horse Artillery, in affectionate memory of his wife, Catharine Rosalie (Lady Selwyn), and is presented by him on the first anniversary of her death to the parish of Richmond, in remembrance of the deep and lively interest she took in everything that concerned the parish welfare during a residence of twenty-one years." The fountain was designed and executed by Messrs. Farley, of the Goswell-road.

THE NEW CADOGAN PIER AT CHELSEA.

THE new pier which has been constructed on the Thames at Chelsea, in lieu of the old Cadogan Pier, which was removed when the Embankment and the Albert Bridge were completed, has just been opened for the traffic of the river steamers. Owing to some differences between the Steam Boat Company and the Thames Conservators, the reconstruction of the pier has not been carried out until within the last few weeks, the consequence being that for more than eighteen months past the steam-boats have not been able to land or take on board passengers at Chelsea except at the old bridge opposite Chelsea Church. The differences between the River Conservators and the Steam Boat Company having, however, been adjusted, the new pier just opened was proceeded with.

The new structure, from its light and ornamental character, compares favourably with the unsightly appearance of most of the piers along the Thames, whilst it is constructed on a new and improved principle, one feature of which is that there is additional security for the landing-stage being kept in its place without the aid of moorings. At each end of the stage iron cylinders, about 8 ft. in width, have been sunk into the bed of the river for a depth of several feet, the upper surface of these cylinders being about low-water mark. In order to strengthen the foundation and secure a solid base, these cylinders have been loaded with concrete to the upper surface level, and upon them rests a circular framework of iron, of a cone or pyramid shape, carried to a height of upwards of 20 ft. above the average low-water level. This framework secures and keeps in its place, at either end of the stage, a massive timber upright, in which there is a groove into which a projection at each end of the stage is fitted, the stage being thus secured during its rising and falling with the ebb and flow of the tide. The stage is about 150 ft. in length and 50 ft. in width, and is approached from the Embankment by a light iron lattice bridge, about 200 ft. in length, with a roadway of 15 ft. wide. The shore portion of the bridge approach, to the extent of one half its entire length, is on a level with the Embankment, and is supported by framework of iron columns sunk a considerable depth into the bed of the river. The remaining portion of the bridge, connected with the stage, rises and falls with the tide. The new pier, which is situated several yards to the eastward of the old structure, has been erected under the superintendence of the Thames Conservancy Commissioners.

THE ARCHITECT AND THE PUPIL.

ARCHITECTURAL ASSOCIATION.

IN the discussion which followed the reading of Mr. Blashill's paper,*—

Mr. Maclachlan, in proposing a vote of thanks to Mr. Blashill, said he could not say that he had come out of his pupilage altogether dissatisfied, although he was not afforded all the opportunities which he thought ought to be possessed by a pupil. In reference to Mr. Blashill's remark as to agriculturists being generally the sons of agriculturists, and that few or none succeeded who were not so born, he believed that as a rule it was best for the son to be brought up to the father's business, unless he showed some marked predilection in another direction. When it was intended that a boy should follow the profession of architecture, the latter years of his school-life should have some bearing on his future pursuit, and it might often be found advantageous to substitute for Latin and French a good grounding in the elements of science. When they entered an office pupils were very rarely able to learn the methods of professional practice as well as the science of construction. In some offices it was considered a very great favour to allow a pupil to go over any works at all, and his chances of seeing practical work were therefore very small. The first thing he was set to do was tracing, followed by a course of inking-in details, and that, again, by inking-in elevations and plans. If he was very clever he learnt a little about planning and designing before his term of pupilage was up, but he would learn nothing of the practical part of his work. Mr. Blashill had recommended that pupils should be allowed to copy documents, and to be present at business interviews between their masters and their clients. As to the latter recommendation, he thought some architects would hear it with great astonishment; and as to copying documents, a man might go on copying specifications and never know the meaning of the terms employed, unless he had some one whom he could ask. If he asked an assistant, he might be met with the rebuff, "I don't come here to teach you"; if he wished to ask his master, he might be engaged with a client, or even if alone in his *sanctum sanctorum*, he might not like to be disturbed. Certainly the information to be gained during pupilage was not sufficient to fit a man to enter upon the full exercise of his profession. Pupilage required to be supplemented by private work on the part of the pupil after office-hours, and, as a matter of fact, most pupils were fully alive to this matter. But three years' pupilage, even in conjunction with private study, would not suffice, in ordinary cases, to fit a man for practice. Assuming that he would have to serve for a few years in the capacity of assistant, even then every opportunity of private study should be taken advantage of. Mr. Blashill appeared to deprecate the spending of time upon such small matters as furniture, metal-work, &c., but he conceived that if a pupil showed taste in such matters he should not be discouraged, for a knowledge of treating such subjects was always of use to the architect.

Mr. R. E. Pownall said that the members of any particular profession were generally apt to consider that that profession had grievances beyond those of any other profession. He could not at all see how the architectural profession, so far as regarded the education of its members, had any paramount grievance. Was it to be supposed that the solicitor took more pains to teach his "articled clerks" than an architect in extensive practice took in teaching his pupils? Certainly not. The articled clerk of the solicitor had, as a rule, not much longer time in which to learn his profession than the architectural pupil had. It was true that at the end of his term of articles the embryo legal practitioner had to come up to a certain standard of knowledge, and that he must pass an examination before he would be allowed to practise for himself. But, then, there was such a thing as "cramming" for an examination; and even after the law-student had passed his examination, he had generally to be content to serve as an assistant in some office. Mr. Pownall proceeded to draw an analogy between the work of the architectural and the law pupil, maintaining that the phases of progress step by step were similar in each case. He agreed with Mr. Blashill in regarding a knowledge of shorthand as of great value to the architect: it would save much valuable time in taking notes. On the whole, he believed that the present system of pupilage was the best suited to our requirements, and whatever deficiencies it might possess could always be easily supplied by the pupil, if he were so minded.

Mr. Leonard, in seconding the vote of thanks, said he agreed with Mr. Blashill on a great many points, and he was especially struck with the conciliatory spirit in which the paper was written, for Mr. Blashill had neither "sat upon" the pupil nor the architect. He (Mr. Leonard) thought that a great deal of mischief was done in the present day by sending pupils from architects' offices practically uneducated as to the real work of their profession. Their parents, anxious to bring them up to a "respectable" profession, were partially accountable for this, for even though they might determine years in advance what their sons' profession should be, they seldom or never sought to make their school education take some bearing on the nature of their profession. Thus it happened that, partly from the fault of the master, and partly from the fault of the parents, pupils concluded their term of pupilage with a very indistinct notion of the nature of their profession. Such young men, after flitting from one office to another, and perhaps picking up very little by the way, rushed into a competition, and on the strength of getting the first premium, set up in business, all-incompetent as they might be. Even when they succeeded in winning a premium, however, such men were never selected to carry out the building, and if their designs were made use of, they were considerably modified by some one else. It was this class of young men who were always eager to lower the dignity of the profession by entering upon a competition, however humiliating the terms. If such young men had inducements held out to them to pass the Voluntary Architectural Examination, it would be much better for them and for the profession at large.

Mr. Aston Webb said that he was certainly of opinion that the system of pupilage was best suited to English requirements; but Mr. Blashill had not entered upon the question of the length of time over which the "articles" should extend. Should it be seven, five, or three years? If either of the longer terms, he thought that three years was quite long enough to stay in one office. In discussing this question, regard should be had to the requirements of the architectural profession rather than to the conditions which obtained in the study and practice of the law. He agreed with Mr. Blashill that pupils and assistants should have access to all business correspondence; unless, indeed, this was the case, they would not be of much use.

Mr. J. Douglass Mathews said that the system of pupilage was based on the old system of apprenticeship,—a system which had of late years undergone a great deal of modification. As Mr. Blashill had pointed out, in former times apprenticeship was the only means of learning a trade, although now there were opportunities of picking up knowledge in a less regular manner; but he preferred the old-fashioned way, as it was better that a man should enter upon his trade or profession through a front door rather than a back one. There was a kind of *prestige* about apprenticeship or pupilage which should not be lost sight of. It was often assumed, in discussing the question of architectural pupilage, that the architect was to be looked upon as a schoolmaster; but an architect who had been plodding on for a number of years to get together a decent practice did not suppose that when he took a pupil he was taking a dolt, incapable of picking up knowledge for himself. On the other hand, it was to the interest of the master no less than to that of the pupil

* See p. 667, *ante*.

himself, that the latter should be directed in his work in such a manner as that, if in earnest, he would soon be of real value in the office. But even with the most complete office-direction, and with the utmost desire to profit by what took place in the practice of the office, no young architect must expect to succeed (unless exceptionally gifted) without having recourse to work and study after office-hours. As to pupils not understanding the technical terms which they were continually copying in specifications, &c., he believed that as a rule it was their own fault for not seeking information; he could not think that a master would object to impart such information. As a rule he was convinced that masters did their best to advance their pupils, especially when the pupil manifested a lively interest in the work of his profession. He agreed with Mr. Webb that it was possible for the pupil to remain in one office too long. As to opportunities being afforded to pupils to see works in progress, he thought that such opportunities ought to be given, or the master failed in his duty. As a matter of fact, he believed that when such opportunities were accorded, the pupil did not always take advantage of them.

Mr. W. W. Robertson expressed his pleasure at listening to Mr. Blashill's very able and moderate paper. The author had carefully avoided partisanship, and had therefore been able to show the mutual obligations of architects and pupils. The subject was an inexhaustible one; and while it might be true that the pupil could not in fairness expect his principal to be a schoolmaster, he might justly claim that he had a right to be taught his profession. It would not suffice to say that the master afforded the pupil facilities for seeing what went on in the office; the master ought to direct the pupil's labour and study into proper channels. In reality, the interests of architect and pupil were identical. If at the end of five years a pupil had learnt nothing, both master and pupil were probably equally blameworthy. He was rather inclined to think that the pupil fared better, on the whole, if articled in a small office,—especially if he was his master's sole assistant in office-work,—than in a large office; for he had the great advantage of the direct supervision of his principal, who would be anxious to make his pupil of real value to him at the earliest possible date.

Mr. Pratt asked what number of pupils Mr. Blashill would think it reasonable for an architect to have in his office at once?

Mr. Clarkson having said a few words.

The President (Mr. Quilter), in putting the vote of thanks, said that in discussing the subject raised by Mr. Blashill's paper, it was necessary to start with a negation of the aphorism applied to poets, for that *architectus nascitur, non fit*, could not be truly said. They were obliged to start with the assumption, then, that the architect had to be made. He agreed in thinking that the education of a youth intended for the architectural profession should bear some relation to his future pursuit. He also agreed in thinking that where a pupil showed any marked predilection for designing furniture or metal work, the bent of his talent should be encouraged. The importance of the pupil being allowed to see works in progress was beyond question, and the master who wished to do his duty by his pupil would give all reasonable facilities in this respect.

The motion having been put and carried,

Mr. Blashill briefly replied on the discussion. He said that while he did not wish to be understood as deprecating real efforts in design, whether of furniture or metal work, he did wish to discountenance the pupil's time being wasted in mere prettinesses. Directly a pupil entered an office, he should be made to work; nor need the principal feel any compunction in exacting such work; for if trained to steady work while young, the pupil would find himself more easily able to apply himself in future years. Pupils should never be backward in asking for information. His (Mr. Blashill's) master used to say that questions were the keys of knowledge. The question as to length of pupilage was a difficult one, and depended more on the capabilities of the pupil than upon anything else. As to the number of pupils any one architect should have at one time, he knew of no rule on the subject; there was no restriction, so he might have as many as he could attend to. But when a pupil came out of his articles, he ought to be able to say he was an architect, if not an experienced one.

The meeting then terminated, and with it Session 1875-76 of the Association.

NORTHAMPTON GENERAL BUILDERS' ASSOCIATION.

A SOCIETY bearing the above title has recently been formed in Northampton, with the object of promoting and protecting the interests of the building trade of Northampton, by the following amongst other means:—Unity of action in the settlement of all questions arising between employers and their workmen, with a view to prevent injustice against individual members of the Association. 2. The general adoption of equitable conditions of contract, such as those agreed to by the Royal Institute of British Architects. 3. The interchange of information and mutual co-operation when desirable with other kindred societies throughout the country. 4. The assistance of each other by grants of money or advice in case of accident or loss by fire, or in any other matter the committee may think deserving of assistance.

On the 12th inst. the Committee appointed to organise the Society invited all those connected in any way with the building trades of the town and neighbourhood to a general meeting. There was a fair attendance. Mr. Thomas Cosford presided. The business of the meeting was of a formal character, consisting of the adoption of rules and the election of officers. The principal regulations of the Society as adopted by the meeting, after full discussion, were as follow:—

The Association shall consist of employers of labour connected with the building trade in Northampton and its neighbourhood duly elected. The members shall pay an annual subscription apportioned according to the number of men employed by each, for fewer than ten, 10s. 6d., and for more than one hundred, 5*l.* 5s. The business of the Association shall be conducted by a president, vice-president, and twelve members, to be elected at the annual general meeting, five to form a quorum; two auditors shall also be elected at the same time. Every member shall strictly conform to the trade rules and rates of wages agreed to by the employers and workmen, but in case of any demand being made by the latter, not consistent with the rules, the employer shall immediately inform the secretary, who shall bring it before the next meeting, or before a special meeting if desirable, and as far as possible common action shall be taken in such matters.

The following were chosen the officers of the Society:—President, Mr. Hy. Smith; vice-president, Mr. Thos. Cosford. Committee, Messrs. H. Martin, J. Watkin, G. Heap, D. Ireson, and J. Brown (general builders); Messrs. Cleaver, Tucker, Goy, and Alsop (painters); Messrs. Banks and Woodford (plasterers); and Mr. G. Belton (stonemason). Messrs. Higgins and Tomes were elected auditors; and the trustees appointed were, Messrs. H. Smith, T. Cosford, and J. Watkin.

THE INSTITUTION OF CIVIL ENGINEERS.

THE originality, labour, and ingenuity displayed by the authors of some of the communications submitted to the society during the past session have led the Council to make the following awards:—

Telford Medals and *Telford Premiums* to Walter Raleigh Browne, for "The Construction of Railway Wagons, with special reference to Economy in Dead Weight"; William Cawthorne Unwin, B.Sc., for his "Investigation of the Motion of Light Carriers in Pneumatic Tubes"; Gilbert R. Redgrave, for "Sewage Interception Systems, or Dry-Sewage Processes"; W. Shelford, for "The Treatment of Sewage by Precipitation."

A Watt Medal and a Telford Premium to Gabriel J. Morrison, for "The Ventilation and Working of Railway Tunnels."

Telford Premiums to C. Boutemps, for "Experiments on the Movement of Air in Pneumatic Tubes"; R. Spelman Culley and R. Sabine, for "The Pneumatic Transmission of Telegrams"; J. G. Gamble, B.A., for "The Brighton Intercepting and Outfall Sewers"; Wilfrid Airy, B.A., for "The Probable Errors of Levelling, with Rules for the Treatment of Accumulated Errors"; Sidengham Duer, B.Sc., for "The Hydraulic Canal Lift at Anderton, on the River Weaver"; G. J. Symons, for "The Floods in England and Wales during 1875, and on Water Economy"; C. Greaves, for "On Evaporation and Percolation"; W. Sugg, for "On Estimating the Illuminating Power of Coal Gas"; J. Nelson Shoolbred, B.A., for "The Changes in the Tidal Portion of the River Mersey, and in its Estuary."

The Manby Premium to D. Alan Stevenson, B.Sc., for "The Dhu Heartach Lighthouse."

Horsham Drainage.—The Local Board have resolved to carry out the plan marked "A. B.," sent in by Messrs. Gotto & Beesley, subject to the approval of the Local Government Board being obtained to the scheme.

STUDENTS, ROYAL ACADEMY.

THE following admissions to the Architectural School of the Royal Academy have just been made:—

Students of First Class.—Henry Branch, E. E. Sayer, S. Vacher.

Students of Second Class.—W. H. Berry, G. W. Browne, J. H. Ince, F. W. Kite, F. A. Powell, W. Stevens, A. H. Tiltman, W. E. Wallis, W. H. Wood, T. C. Yates.

Probationers.—R. S. Allen, H. Bradfield, H. W. Burrows, H. B. Cullerne, W. S. Fraser, A. J. Gale, F. Hemings, J. F. Hennessy, A. S. F. Kirby, W. Millard, R. J. Morris, H. A. Pelly, G. H. T. Prynne, J. Robbins.

THE AMALGAMATED SOCIETY OF ENGINEERS.

THE annual report of the Amalgamated Society of Engineers, Machinists, &c., for the year 1875 has been issued. At the end of 1875, there were 44,032 members. During the year there had been admitted 3,210 new members; but over against this accession of recruits or conscripts, must be set the death-list of 570 members, and the "black-list" of no fewer than 1,627 members expelled the Society in twelve months for sundry offences against its rules, chiefly for arrears in the payment of contributions and for misdeeds vaguely described as "acting contrary to the Society's interest." These deductions by death and default reduce the net increase of the Society in 1875 to 882 members. The total of the Society's income for the year was 120,024*l.* About 114,000*l.* of this total are the receipts from members' contributions, propositions, and entrance fees. At an average payment of 1s. per week, 44,032 members would yield a revenue of 114,478*l.* Thus it may be taken that 1s. per week is somewhere about the sum paid by each member on the average for his share in the advantages the Society offers, and the provision it makes for the various contingencies of a trade unionist workman's life,—want of work, suspension of work on account of trade disputes, accidents at work rendering the sufferer temporarily or permanently unable to labour, superannuation by old age, sickness, and death. The Society makes stipulated pecuniary allowances to its members in each of these casualties, and completes its undertaking to every member by paying to his family after his decease a sum not exceeding 12*l.* for his funeral expenses, and for other purposes of family necessity. The Society's expenditure in 1875 was 94,371*l.*; or nearly 26,000*l.* less than the income; and consequently the balance of the reserve-fund or accumulated assets of the Society was raised in twelve months from 238,989*l.* to 264,641*l.* This fund amounted at the close of the year to about 6*l.* for every member entitled to benefits. Six years ago the Society had in its treasury not more than 2*l.* 5s. per member. The improvement of its financial account has therefore been marked in the interval. Its expenditure last year under the several heads amounted to 2*l.* 2s. 9d. per member.

CASES UNDER BUILDING ACT.

BUILDING WITHOUT NOTICE.

ON the 18th of July, 1876, George Tolfree, of No. 8, Queensbury-street, Essex-road, Islington, and J. Digby, of No. 28, Queensbury-street, Islington, were summoned at Clerkenwell Police Court before Mr. Hannay, by Mr. Rowland Plumbe, district surveyor, South Islington, for that they did in May and July erect certain buildings in the rear of No. 310, New North-road and in rear of No. 10, Queensbury-street, without giving him, as the district surveyor, any notice.

The District Surveyor stated that, in consequence of a written complaint sent him, he went to the rear of No. 310, New North-road, and found that a building 15 ft. 10 in. by 9 ft., and 7 ft. to 9 ft. 6 in. high, had just been erected; it was enclosed nearly all with wood, had a tiled roof, and it adjoined and was nailed to another wooden building in rear of No. 10, Queensbury-street without any party wall being built between them. Both had flues in them, and if a fire occurred in one it would extend to the other. He (Mr. Plumbe) ascertained the defendants had erected them, and on the 5th of July served them with a notice requiring them to remove the wooden enclosures, and enclose them with walls constructed of brick, stone, or other hard and incombustible substance. This had not been done, and he now summoned them for the penalty for not giving him, as the district surveyor, any notice, and also for noncompliance with the notice of irregularity.

Mr. Hannay fined them each 40s. and costs, and made an order for the buildings to be enclosed with walls, &c., according to the notice of irregularity.

MUSEUM OF HYGIENE.

AT a meeting lately held at the residence of Mr. Erichsen, at which were present many of those who were associated with Dr. Parkes at University College, it was resolved,—

"To establish at University College, London, a permanent memorial of the late Dr. Parkes, in such a form as to aid scientific investigation and practical study in the subjects to which Dr. Parkes's life was especially devoted." It is hoped that a sufficient sum may be collected to establish a Museum and Laboratory of Hygiene similar to those now existing at the Army Medical School, Netley. There is at present no Museum of Hygiene or Sanitary Science in London, and it is felt that the establishment of such a museum would prove a great boon to the members of the medical profession, and to engineers, architects, and others, who are interested in sanitary progress. The promoters say it should be borne in mind that University College is a place for the education, not only of medical men, but also of architects, engineers, and others, on whose thorough instruction in sanitary details the health of the public so largely depends. Subscriptions may be sent to Mr. Erichsen, 6, Cavendish-square.

MASTERS AND MEN.

Bristol.—A new code of rules has just been agreed to and signed by the representatives of the Bristol Master Builders' Association and the local branch of the operative Stonemasons' Society, for the guidance of both employers and operatives. Most of these rules are substantially the same as before, but there are two or three important alterations and additions. One rule enlarges the city boundary, and another provides "that no employer of masons sub-let any mason's work, and no mason work by piece or sub-contract with or for any employer of masons.* The present custom as to worked stone is not to be interfered with by the operation of this rule." The rule was formerly worded, "No master mason or builder shall," &c., but under that regulation persons engaged in extensive building operations, who employed a clerk of works to manage affairs, were exempt, and hence alteration. The latter sentence as to worked stone is an addition. The wages rule reads, "That the wages shall be 8d. per hour throughout the year, fifty-four hours per week to be worked from the first Monday in March to the second Monday in November, and forty-eight hours per week from the second Monday in November to the first Monday in March." The rate of pay is thus ½d. per hour more than before. It was for this advance that the strike recently took place, and the increase was given on the men agreeing to the new regulations. The last rule on the list is as follows:—"That six employers and six operatives act as a standing committee to hear and determine any minor disputes that may arise from time to time as to the intention and working of the foregoing rules, and their decision shall be regularly binding on both parties, and that no suspension of labour shall take place pending the decision of the conciliation committee." It is to be hoped that the existence of this committee will prevent trade disputes taking place so frequently as in the past. We understand that during the past week the masons in the employ of Messrs. Brock & Bruce, one of the largest firms in the city, have struck work because those gentlemen had some non-society hands in their service.

TEMPLE COWLEY, OXFORD.

THE foundation-stone of a school-chapel for the above district was laid on Monday, July 3rd, by the Venerable Archdeacon Clerke. The new buildings, when completed, will accommodate 150 persons, when used for divine service, and 96 children, when used as a school, will comprise chapel-school and class-rooms, shut off when used for school purposes from each other by folding-doors, lavatory, and cloak-room, with porch adjoining, and the necessary offices. The plans, which also include the necessary buildings for teachers' residences, are estimated to cost about 1,450*l.*, which includes, also, all necessary drainage, fencing, &c. Mr. Henry Castle, of Cowley-road, is the builder; and Mr. A. Mardon Mowbray, of Cowley Lodge, Oxford, the architect.

* The workmen thus shut the door through which so many of their class have from time to time passed into the class of employers.

LEAD IN AMERICA.

THE production of what the *Iron Age* (New York) terms "domestic" lead in America has so greatly increased during the past few years that, for general purposes, there is no longer a large demand for imported metal. Since the development of an extensive lead mining interest in Utah and Colorado, the domestic production has been greatly increased, and promises a development in proportion to the consumptive requirements of the country. When Missouri was the principal source of supply the annual consumption was about 60,000 tons, and 40,000 tons of common were imported, in addition to a production of 20,000 tons of soft for corroding purposes. Since then the domestic production has increased and the importation fallen off, and the bulk of the lead consumed in the country is now produced at home. The statistics of domestic production are at all times difficult to obtain with accuracy, owing to the great extent of the lead-producing territory of the West: hence it has not been easy to judge of the position of the metal. This, in connexion with the uncertainty which has existed with regard to the probable future requirements of the building trades, has been instrumental in causing many otherwise causeless fluctuations in the lead prices. The perplexities surrounding the course of lead were further increased by doubts as to the course the Government would pursue with respect to the stock it still held, and which was to be turned over to consumption. Under these circumstances it was to be expected that attempts would be made to control the metal by large speculative purchases, and although speculation has at no time since 1873 been assisted by a large consumptive demand, they have nevertheless, exercised at times an important influence on the course of prices. Of the lead consumed in America about 30,000 tons are absorbed for general uses, such as plumbing, shot, &c., and the remaining 30,000 tons are taken by the manufacturers of white-lead. In Missouri, great efforts have been made to produce all the soft lead needed for corrosion, and thus dispense with foreign lead altogether. Ability to do this as yet may be doubted, and this adds another element of uncertainty to the future of the metal. Taking advantage of the situation, the speculators have organised a movement during the past few weeks which has resulted in advancing the price of lead considerably, including pretty much all varieties.

PROPORTION IN THE FINE ARTS.

SIR,—The *Builder* of last week contains some strictures on my lecture on "Proportion," which I believe would be answered by a careful perusal of the lecture in its entirety.

In consequence of previous lecturers complaining of being baited by a number of debaters who, instead of listening to the lecturer, are pondering over their own speeches, it has recently been enacted by the council of the Society for the Encouragement of the Fine Arts that the talk after the lecture should be limited to that of asking questions. Nevertheless, and contrary to the new rule, discussion at my lecture was invited. To this invitation, however, only one or two responded, and therefore the chairman closed the evening by expressing a favourable opinion on the views I had brought forward. For my own part, I can only say that I am exhilarated by free debate, and was not in the least aware that any of my audience desired to break a lance with me. It is not every lecturer, however, who, immediately after his lecture is over, likes to be told by his audience that they know more about the subject than he. If I rightly understand the writer of the article on "Proportion" in last week's issue, he agrees with me that the human canon of beauty must be the mean of the measurements of a great number of individuals. Both Hogarth and Sir Joshua admitted the golden mean to be the metrical expression for beauty; but I believe I have been the first in recent times to point out the practical method of obtaining it. Dryden most comprehensively expresses himself when he says, "There is a mean in all things, and a certain measure wherein the true and the beautiful consist, and out of which they never can depart."

It is a great mistake, and a very prevalent mistake, to suppose that all art must be beautiful. The essential condition of all true art, as that of all true nature, is, that it shall be adapted to its purpose. There are wonderful forms of being, all admirably adapted to their purposes, but which are nevertheless absolutely hideous to human beings. It is a certain conformity to our human nature which constitutes beauty.

The Greeks sought above all things the beautiful, but the moderns have other leading motives, and the adaptation of art to these motives, or by these motives, has superseded the pursuit of the beautiful.

The writer of the article referred to admits that the method of averages is that which should guide us to the measures of beauty, and yet repudiates the same method when applied to architectural forms. But is not the human figure itself a glorious piece of architecture? This is a house too—"The House of the Soul." And if the method is applicable to this, why not to the lower and inferior kind of architecture? It is not all human beings that are formed in the beauty of the mean. All other individual or special forms are adapted to a special purpose, and depart from the mean or mid-form in various degrees into ugliness, as your special forms and adaptations in architecture do. If you call these adaptations "beautiful," it is in a rigorous sense a misnomer. I should never expect to find the ratio of *mean* variation, 1 : 2, in Gothic architecture. Grecian architecture stands, as it were, as a *mittel-punct* between your Egyptian and your Gothic. It is the architecture in perfect accord with the beautiful humanity, and therefore exhibits a moderation in its proportions. The Greeks considered the ratio of 1 : 4, as scientifically it is, extreme.

The science of art is but a science of the human nature—perfect nature works according to just instincts. Our metrical science, our science of proportion, is but a measure of these. But as rational beings we desire to add knowledge to feeling.

There is a certain rhythm or music in all fine works of art, as may readily be discovered by attempting to change those proportions which the consummate artist may have in any case determined.

The symbols 4 : 8, 8 : 16, and 16 : 32, are only different modes of writing 1 : 2. They are, in fact, the same ratio. But of all detail I shall have more to say elsewhere.

I might tell a great many people that they had much better do anything but write. It is, however, but common courtesy in all public correspondence to leave the reader to judge whether the writer is speaking to the purpose or not.

W. CAVE THOMAS.

ST. SWITHIN'S CHURCH, EAST GRINSTEAD.

SIR,—In your number of January 9th, 1875, you mentioned some differences of opinion respecting alterations in this parish church.

Now that eighteen months have elapsed, and good feeling prevails, I venture to say a word as to the present and future. We are now actively engaged in pointing the walls, and erecting a new nave roof in accordance with the style of the church. The roof is from the plans of Mr. J. M. Hooker, architect, of Sevenoaks and London, who designed the oak seating, of which one-third remains to be completed.

The acoustic properties of this large church are greatly benefited, as well as the appearance improved, by the removal of the ceilings, and this is now generally admitted. Moreover, the present roof is unsound. As you will see by the enclosed papers, a further sum of 500*l.* is required to finish the roof, and complete reseating; and most happy shall I be to show the work, give any information, and receive contributions from any liberal friend of church restoration for a much-needed work.

DOUGLAS Y. BLAKISTON,
Vicar of East Grinstead, Sussex.

ROMSEY ABBEY.

SIR,—With regard to the remarks in the *Builder* on the east end of this most interesting building, I think there can be no doubt whatever that the lady-chapel was originally completed, and that it was destroyed in comparatively modern times. The two geometrical windows, which appear now to fit so well under the Norman arches in the east wall, were, a few years ago, at a higher level. When the lady-chapel was pulled down, these windows, taken, no doubt, from the outside walls, were very clumsily erected within the Norman arches, without properly calculating their height. There was

not, in consequence, room for the point of the tracery and the key-stones under the arch, and they finished in a very rude and unsightly manner. The vicar, the Rev. E. L. Berthon, who is a very clever mechanic (as well as astronomer), skilfully lowered both windows bodily, without taking them to pieces, and inserted key-stones, so as to give them their present complete appearance. C. H. P.

CONCRETE FLOORS.

SIR,—I have read with much interest the discussion in your paper on "Concrete Floors," and have been surprised no mention has been made of the concrete and rolled-iron joist-floors in the Ecoscephoron, by Victoria Station, Pimlico. These floors must have been designed to carry the heavy weight of furniture which would have to be stored upon the same, yet, soon after they were finished, nearly the whole of the floors fell in about six weeks since, fortunately after the men had left, or, I understand, about fifty men would have been killed. Can the architect or builder of the job give some information as to the construction, or any explanation as to the cause, and who was liable? I am of opinion all who feel any interest in concrete floors and iron joists should survey at once the Ecoscephoron, for their future guidance. CONCRETE.

ENDOWMENT OF GENIUS AND RESEARCH.

SIR,—"Meter's" letter teems with truth in every line. I have waited to see a reply from an abler pen than mine.

Sir, allow me to enter the arena, not to gain applause, but to point to the waste of lives, and millions, in foibles, squabbles, wars. Work at home we have in plenty to employ our men, and wealth in a hundred ways that pay to promote the public weal and health, viz., ships can be made unsinkable and uninflammable when out on the rolling deep. We want structures that will not carbonise contents or immolate inmates when asleep; also safety on the iron road, not hurry-scurry dash, that too oft ends in railway jam,—I mean a railway smash.

On, potentates and magnates! devote your means and time to the many thousand miners that are yearly blasted in the mine; and, Genius, you may solve the sewage problem, or burn the smoke of town; though you will never gain a diadem,—perhaps, not half a crown. "Meter," you laid and fired the first gun home, and true; if I can't hurrah with idle crowds, I'll doff my cap to you. R. T.

HASTINGS BATHS.

SIR,—In the notice of the Hastings Baths contained in your issue of the 8th inst. (p. 661), I observe a statement that "some misunderstanding seems to have arisen between Mr. Adcock and the directors of the company as to his liability, and failing to arrive at an amicable settlement, he threw the contract up."

As this statement is calculated to injure me, I shall be obliged if you will put before your readers the whole truth, which is as follows:—

In the latter part of last year the work was advertised for tender, and two tenders were received, which were not considered satisfactory. The architects applied to me for a tender, and supplied me with bills of quantities for the work, in which there were no conditions.

I sent in a tender for the work early in December last, and enclosed in the same envelope was a letter in which were the following words:—"The only condition I wish to make is, that I must not be held responsible for the damage done by the sea,—I mean with respect to any part of the sea-wall being washed away by storm. I do not mean small damages, which may occur, more or less, every tide; I will be responsible for them. I do not think there is any risk; but I should not be willing to carry out the work with the unpleasant feeling that I might be ruined by a single storm."

This condition was, of course, a part of my tender. I afterwards attended a meeting of the directors, and was told by the chairman that my tender was accepted, and that I could commence at once.

When the draft contract was sent for my approval, I found, to my astonishment, that I was to be held responsible for all damage that might happen "by inroads of the sea, high tides, storms, or tempests."

As your readers will at once see, it was impossible for me to agree to this, as it was a direct variation of the terms upon which my tender was accepted. Considerable discussion took place, but the directors insisted on the altered terms, which I could not agree to. I have always been ready and willing to commence the works upon the terms of my accepted tender; and as new terms were sought to be imposed by the directors after such acceptance, I think you will agree with me that it is hardly correct to say that I threw up the contract.

W. J. ADCOCK.

Fall of a Wall.—About 20 ft. of wall, 18 ft. high, fell in Sheffield on Monday, killing a labourer named Langfoot, and burying and severely injuring several others. The road by the side was being lowered, and this caused the wall to tumble.

BREACH OF CONTRACT BY A WORKING BRICKMAKER.

AT the Staines Petty Sessions, on the 10th inst., James Regan was summoned for 4*l.* damages, for breach of contract in leaving the service of Mr. Catling, brickmaker, of Shepperton:—

William Catling, jun., said he was foreman to his father. On the 4th of March an agreement was entered into with the defendant to work as a temperer. The agreement was read to him, and 6*s.* paid as hiring money. It was agreed that 1½*d.* per 1,000 bricks should be retained as security for the fulfilment of defendant's agreement, which was to be returned at the end of the brickmaking season. On Monday, the 3rd of July, defendant had some words with the moulder and left his work. Witness saw him, and after an explanation defendant said he would return to his work on the following day. He did not come till the Thursday, and then only worked for about an hour. Through the defendant's leaving, the whole "form" of seven men were unable to work. He estimated that through the defendant's conduct there were 8,000 bricks less on the week's return, which caused a loss to them of about 2*l.* They also had to pay another man a fee of 2*l.* to take defendant's place. They had put defendant on a month before he was wanted, on purpose to retain his services during the brick season.

Edward Catling also gave evidence in the case.

Defendant was ordered to pay the sum of 4*l.* as compensation to Mr. Catling, and 11*s.* 6*d.* before the 15th inst., or a distress warrant to be issued.

CHURCH-BUILDING NEWS.

North Petherwyn.—The parish church of North Petherwyn, near Launceston, was reopened on the 22nd ult., after restoration under the superintendence of Mr. J. P. St. Aubyn, architect. It exhibits work of almost every century since the Norman conquest. Originally it was a Norman cross church, and of this period the massive polyphant columns of the south aisle, and some of the work in the tower, remain. Opposite the columns were found the foundations of similar supports. Over the two columns that remain spring arches of the Transition period, with two lights of a later clearstory. The north aisle, beyond the Norman work, is continued, at a greater width, by post-reformation arches of granite, this part of the aisle occupying the site of the chantry chapel of the old Norman building. The great part of the wall of the chancel is Early English work, and the south aisle, divided from the nave by an arcade of four granite arches, almost semi-circular, is believed to be fifteenth century work. The many interesting features of the church were all but lost to view in the church in its pre-restored state. Much of the woodwork of the roofs was lost in plaster, the columns were covered with innumerable coats of whitewash, many of the windows had been partly built up, the pillars of the south aisle were from 15 in. to 18 in. out of the perpendicular, and the church was so damp that the walls were a bright green, and in a state of general decay. The restoration has been accomplished at the sole cost of the Duke of Bedford, the owner of most of the land in the parish. At first it was intended to substitute pointed wind-brace roofs of pitch-pine; but when the roofs of the chancel and aisles were uncovered it was found that they were of the wagon pattern, although lath and plaster had long covered up all but the ribs and bosses. In consequence of this discovery it was resolved to restore the work. The old open roofs are accordingly now seen, with new bosses and wall-plating richly carved in imitation of the old, wherever decay had set in. The roof of the nave was found to be modern work, and beyond repair; and it has been replaced by a strong hammer-beam and king-post roof of pitch-pine, with couplings between, resting on moulded corbels. Additional strength was here required to keep the south aisle in its place. The arcades on either side of the nave have had the whitewash removed, the stones repaired and re-axed,—in fact, restored to their pristine condition. A new east window of fair proportions has replaced a very mean opening, and the ancient window on the south side of the chancel, partly built up, has been restored to its original dimensions. Both the south wall and porch and the west end of the south aisle had to be taken down and rebuilt. The north porch has been rebuilt with the old material, the new roof being an open one of pitch-pine. Both porches have been fitted with heavy oaken doors. The tower has been opened up to the massive moulded girders of the new belfry floor of pitch-pine, and has been thoroughly restored. The whole of the work has been carried out by Mr. P. Blowey, of Buckland Monachorum, the cost being about 3,500*l.*

Northenden.—The parish church of St. Wilfrid, Northenden, Cheshire, has been consecrated, after having been entirely rebuilt, with the exception of the tower. It is believed that the present building is the fifth which has occupied the same site. There is thought to be no doubt that in Saxon times the church was dedicated to St. Wilfrid, and this, the original, church, was followed by a Norman structure, and in after ages by others. The new church is a faithful copy of the old one, and is in the Perpendicular or Third Pointed style. The old tower still remains, but it is to be hoped, according to a local paper) that although the energies and resources of the parishioners have been severely taxed already, this will soon be rebuilt, and the restoration made complete. The pews are open, of pitch-pine, stained and polished. The architect is Mr. Crowther, Manchester, and the contractors were Messrs. Clay & Sons, of Audenshaw. The cost of the new edifice will be about 8,000*l.* The nave and aisles have been erected by the parishioners, and the ancient chantry and chapels of the Tatton family have been rebuilt at the expense of the lord of the manor, Mr. T. W. Tatton, while the chancel has been restored at the sole cost of the vicar of the parish, Archdeacon Johnson.

Maud (N.B.).—A new Established Church has been erected in Maud, near the railway station, within the boundary of Old Deer. The church was opened on the 22nd ult. It was designed by Mr. James Laing, architect, Old Deer, and has been erected by tradesmen of the district. The mason's work was done by Mr. John M'Knight, New Maud; the carpenter's work, by Mr. W. Jack, Bulwark; the slater's work, by Mr. James Brown, New Maud; and the plasterer's work, by Mr. D. M'Pherson, Old Deer. The contracts for the building were,—for mason's work, 480*l.*; carpenter's work, 386*l.*; slater's work, 130*l.* 10*s.*; and plasterer's work, 58*l.* 10*s.*, giving a sum of 1,055*l.* The cost of enclosing-walls and gates has to be added, making the total outlay 1,200*l.* The church is in the Gothic style. It is wholly of stone of the district. The outer walls are partly in dressed block granite, and partly in blue whinstone. The principal elevation is the gable fronting the public road. The length of the church is 75 ft.; height of side-walls, 20 ft.; and from ground to apex of gable, 47 ft. The church is seated for 420. The whole fittings are of pitch-pine.

Clapham Junction.—St. Peter's Church, Clapham Junction, was consecrated by the Bishop of Winchester on the 29th ult. The style of architecture adopted is Early English, and the church has been built of coloured bricks, with Bath stone and red-brick dressings. There is a nave, north and south aisles, and apsed west end, north-west porch, south chancel, chancel aisles, two connecting vestries, with organ and choir-vestry over them, and a south-west tower and spire. The tower is of brick, and the spire is of Bath stone, intercepted by bands of brick, and terminating by a vane at the height of 150 ft., and is a striking object from whichever point it is seen. The north-west porch forms an annexe to the main building. A sculptured figure of the patron saint—St. Peter—occupies a position in a niche in its gable. The nave is exceptionally wide. The lean-to aisles are divided from the nave by arcades of five bays, and these are supported by clustered columns of Pennant stone, surmounted by richly-carved capitals. The arches are of moulded bricks. Above these is a clearstory. Springing from carved-stone corbels is an open-timbered roof of massive construction. The interior walls are of red bricks, save in the sprandrels over the arcades, which are plastered. The avenues and chancel are laid with encaustic tiles by Mr. Minton; amongst them seven large subject tiles are introduced. Under the seating, the floors are formed of herring-boned wood-paving. The open benches are of deal, stained and varnished. "The minstrels' gallery," wherein is the organ, corbels out over the vestry in the south side of the chancel, and has a front of open and carved work. The altar-desk is of brass, and is a present to the church by the clerk of the works, Mr. W. H. Williams. The font is situated upon a raised platform and base, consisting of several steps. These are in Forest of Dean, Dumfries, and Painswick stone, used alternately, and they are enriched by inlaid tiles and marbles. The font itself—that is, the stem and bowl—is made from one block of pale alabaster. The pulpit has a base of Forest of Dean and Dumfries stones. It is seven-sided on plan, and the main portion is of Caen stone, moulded and carved. The pulpit and font have been made and placed *in situ* by Mr. Harry

Hems, of Exeter, who, with his assistants, has also executed the whole of the sculpture and wood and stone carving in the church. The architect is Mr. William White, the builder being Mr. Carter, of Holloway. The total cost is about 10,000*l.*

Hawsker.—On the 29th ult. Sir Charles Strickland, bart., laid the foundation-stone of the new Church of All Saints, at Hawsker, three miles from Whitby. The new church will be built in the centre of a wide agricultural township. The design adopted for the building is that of Mr. E. H. Smales, architect, of Whitby, and the execution of it will involve an outlay of 1,500*l.*, or rather more. Sir Charles Strickland, in addition to being a donor to the building fund, gives all the stone required for the building of the church, from his local quarries. The church is to be built in the Early French style, with a tower and spire, and will contain seats for 300 worshippers. The interior will comprise nave, chancel, vestry, choir-vestry, accommodation for organ, &c. The contractors are Mr. George Winterburn, of Whitby, for the mason's work; Mr. R. Robinson, of Whitby, for the carpenter's work; Mr. Joseph Brown, of Whitby, for the plumbing, &c.; and Mr. T. H. Readman, of Whitby, for the painting and decorating.

Shottermill.—St. Stephen's Church, Shottermill, near Haslemere, Surrey, was reopened on the 22nd ult., after restoration. The church was formerly a plain square building, with no chancel, and with an entrance under a shingled tower at the west end. The works now carried out comprise a chancel, in the Early English style, and a convenient vestry adjoining. The roof of the old church was, to a great extent, of English timber of large span, and the walls were carried out in various directions. The old roof has been taken off and a new one added, with buttresses to resist the thrust. The western doorway into the tower has been closed. The place under the tower has been formed into a baptistery, a new entrance being made on the south side of the church. The works have been carried out by Mr. Pink, of Milford, contractor, under the superintendence of Mr. J. W. Penfold, architect, and Mr. C. Bridger, clerk of works.

Kinneff.—The parish church of Kinneff, which possesses matter of interest to every true Scotchman, has just been re-opened, after undergoing extensive repairs. The present church was built in 1738, on the site of the former parish church, which, in its turn, had been built on the site of an ancient chapel subject to the Abbey of Arbroath. The church was repaired in 1830, but repairs had again become necessary, and the minister and heritors of the parish, feeling that the church has a story, and that a national interest attaches to it, resolved that these should be executed in a liberal manner, and this has been done under the superintendence of Mr. J. R. Mackenzie, architect, Aberdeen. The galleries were inconvenient, and have been removed, a considerable addition has been made to the buildings, a new pulpit has been put up, and all the pews have been re-arranged. A new heating apparatus has been fitted up, and the interior may now serve as a model for a country church. The Regalia of Scotland were hidden in this church from 1652 to 1660, under circumstances described by Sir Walter Scott in his "Tales of a Grandfather." There are some curious old monuments in the church, which can now be seen to advantage. The chief of these is Grainger's monument, which is placed at the west end of the church.

National Competition Drawings.—The prize drawings from the various schools of art in the United Kingdom were on private view at South Kensington Museum on Wednesday. The works submitted in competition since the last exhibition number no fewer than 257,926, of which upwards of 1,100 are now hung in the Museum galleries. Ten gold medals, twenty-five silver, and sixty bronze, besides book prizes and other distinctions, have been awarded. Of all the schools that at Lambeth, of which Mr. Sparkes is master, would seem to have been the most successful in carrying off honours, as many as three out of the ten gold medallists having come from that institution. The drawings are of a very miscellaneous description. The names of the students who have obtained gold medals are as follow: — Samuel W. Fisher, Marie Prevost, Thomas Goodall, Lydia H. Haberson, William Logsdail, J. Kean, Herbert Seagrave, W. A. Jobbins, Robert Needham, and Robert R. Green.

DISSENTING CHURCH BUILDING NEWS.

Southleigh.—The foundation-stone of a new Wesleyan Chapel at Southleigh, near Witney, has been laid. The chapel is being erected as a memorial to the founder of Methodism (Southleigh Church being the place where his first sermon was preached). The chapel is to cost 500*l.*, and the contract for its erection has been taken by Mr. William Cantwell, builder, Newland. The architect is Mr. Charles Bell, of London.

Byker.—The corner-stones of a new Primitive Methodist Chapel and Schools at Byker were laid on the 27th ult. The site of the buildings is in the Heaton-road, a new thoroughfare recently opened out, and near its junction with Shields-road, the plot of ground forming the site measures 77 ft. in frontage, by about 131 ft. front to back, and the erections will comprise a chapel, measuring 64 ft. by 41 ft., and Sunday Schools, two stories in height, measuring 50 ft. by 33 ft., and four class-rooms and vestries, adjoining the latter on the north side of the site. The style adopted is Classic, freely treated. The chapel is intended to accommodate about 600 persons, and the schoolrooms 600 scholars. The total estimated cost of the scheme is about 5,000*l.* The buildings have been designed and will be carried out under the superintendence of Mr. Thomas Parker, architect, Newcastle-upon-Tyne.

Shavington. — The corner stones of a new Wesleyan Chapel, at Shavington (a suburb of Crewe), were laid on the 28th ult. The chapel is being erected on a site adjoining the new Board schools. The dimensions internally are 45 ft. by 30 ft., and the accommodation will be for about 200 persons. The plans also comprise a schoolroom capable of accommodating 100 children, but for want of funds the erection of this is postponed for the present. The style is Gothic of a free type, and the materials to be used are red brick and stone dressings. The building is being erected from the designs of Mr. George B. Ford, architect, Burslem; and the builder is Mr. Enoch Ellson, of Hough. The amount of the contract is 812*l.* 3*s.* 10*d.*, which is exclusive of boundary fencing and warming apparatus.

Swansea.—A new Congregational Church, in the Carmarthen-road, Swansea, was opened on the 18th ult. The new chapel is of a mixed style of architecture, from designs by Mr. Williams. The wood-work of the interior is of pitch pine, with the exception of the front of the gallery and the platform, which are of white picked out with gold. The ceiling is also of pitch pine. The building is of local stone, with Bath stone dressings. The builder was Mr. Thomas White, of Swansea. The cost of the new structure is 2,000*l.*

Keith.—The work of re-roofing the United Presbyterian Church, Keith, Banffshire, has been entrusted to Mr. F. D. Robertson, architect, who is preparing sketches to lay before the congregation for their approval.

Sowerby.—The Wesleyans of Sowerby, near Halifax, have determined to replace the chapel destroyed by fire a few months ago. The plans for the new chapel have been designed by Mr. C. F. Patchett, of Halifax. When erected, it will stand on the old site, but by taking in space formerly occupied by vestries, will be a much larger building. It will be in the Italian style. It is proposed to commence building the schools beneath the chapel as soon as possible. The cost of these schools will be from 1,000*l.* to 1,100*l.*; when the chapel is erected, it will involve a total expenditure of about 4,000*l.*

Carbrook.—The memorial-stones of a new Wesleyan School Chapel at Carbrook have been laid. About three years ago Mr. Joseph Angus gave a plot of land in Carbrook-street, upon which a school chapel might be erected. Eventually a start was made, and the plans of Mr. J. D. Webster were selected. It was arranged that on the ground-floor there should be a large schoolroom, 51 ft. by 30 ft., and two class-rooms adjoining, each 14 ft. by 12 ft. On the first floor there will be rooms of corresponding dimensions to those named. The building will be of brick, with stone dressings and brick bands. Each of the schoolrooms will accommodate about 250 children, and the entire cost is expected to be about 1,800*l.*

Geddington.—The Union Nonconformist Chapel at Geddington has been rebuilt on another site. It is in the Gothic style, and is capable of seating about 100. Mr. R. W. Johnson is the architect; Mr. Mace, of Brigstock, the builder; and Mr. Buckby the painter and glazier. The cost has been about 700*l.*

Cridling Stubbs.—On the 21st ult. memorial stones were laid of a new Wesleyan Chapel at Cridling Stubbs, near Knottingley. The chapel will accommodate, when completed, about 120 persons on the ground floor. The works will cost about 500*l.*

Bellshill.—On the 20th ult. the foundation-stone of the Bellshill Free Church, Motherwell, which is in course of completion, was laid by Provost Swan, of Kirkaldy. The new church is a handsome structure in the Gothic style, from a design by Mr. D. Clunas, architect, Edinburgh. There is sitting accommodation for 1,000 people, and the estimated expenditure is about 3,000*l.*

SCHOOL BOARD SCHOOLS.

Great Dalby.—New Board schools at Great Dalby have been formally opened. The buildings are of brick, with white stone dressings; and a bell-turret surmounts the whole. The master's residence forms part of the block. The school has an open-timbered roof, and the interior walls are pointed. The roofs are all covered with blue slates, and have red ornamental tile cresting. The total outlay, including fittings and site, is 1,100*l.* The works have been carried out by Mr. Barnes, contractor, of Melton, from the designs and under the superintendence of Mr. R. W. Johnson, architect, Melton Mowbray.

Southampton.—New Board Schools in Bridge-road, Southampton, were opened on the 13th inst. The schools have been built from a design by Mr. E. T. Howell (the architect to the Board), by Mr. H. I. Sanders, of Southampton. The area of site is 791 square yards, and the accommodation in the schools is for 225 boys, 234 girls, and 309 infants, total 768 children, allowing 8 ft. for each. Average, 112 cubic feet of space per head in school and class rooms. The buildings have a frontage to Bridge-road of 50 ft., and to Latimer-street of 140 ft. On the ground-floor is the boys' schoolroom, with two class-rooms, having the entrance from Bridge-road. The girls' schoolroom, with two class-rooms, are situate on the first-floor, over the boys' school, with the entrance from Latimer-street. The accommodation for infants consists of a junior schoolroom with class-room on the ground-floor, and senior schoolroom with class-room on the floor above, with entrance from Latimer-street. The rooms are lofty and well lighted by large side and end windows, the upper portions of which are made to open for ventilation with Elsley's patent levers. The warming will be by open fires. Moon's dual desks for arranging the children in pairs are used. The cost of the building is about 7*l.* per child, the total cost being 5,200*l.*

Brighton.—The Pelham-street Schools,—the sixth erected under the auspices of the Brighton School Board,—were formally opened on the 12th inst., by the Lord Mayor of London. The schools, although not formally opened until the 12th inst., have been applied to their uses for above a month, and a description of them was given by us a few weeks since. It is, therefore, only necessary to repeat that they are built in the "Domestic Gothic" style of red kiln and white Suffolk bricks, with Doulting freestone dressings; that accommodation is given, in three distinct departments, for 250 boys, 250 girls, and 250 infants. The total cost, including ground and furnishing, has been 10,000*l.* Accommodation is provided for 750 children. Mr. Simpson is the architect, the builder being Mr. Bruton.

LEWES WATERWORKS.

SIR,—In the *Times* for Tuesday, 18th July, page 6, second column, and about thirty-seventh line down, the military correspondent, writing about the army movements, says,—"Neither can I think that Lewes has been judiciously selected as a point of concentration. It is true there are plenty of supplies in the neighbourhood; but were the steam waterworks destroyed, or out of order, there would be no water between the Ouse, or Oose, which passes through Lewes, and the Arun, which is some distance to the rear."

In the *Builder* for November 6th, 1875 (page 995), under head of "Lewes Waterworks," it says,—"Much care and foresight appears to have been used in planning this pumping station, so that there is little fear of any breakdown occurring through accidents; for if one engine failed, others would be used while repairs were being made, and the same remarks apply to the boilers."

"The supply of water is inexhaustible, for when pumping 1,050 gallons per minute, the water in the well stands at 12 ft. below ground level, and when pumping ceases it rises until within 5 ft. of ground line, at which level it stops."

This information was taken down while standing by one of the engines at work, and certainly ought to be correct; and if the *Times* military correspondent will make inquiries, he will find it is so.

I think it due to the town of Lewes, as well as the Waterworks authorities, that there should be no misunderstanding in the matter of water supply. B.

STAINED GLASS.

Frome.—The east window of Trinity Church, Frome, has been filled with stained glass, in memory of its first incumbent, the late Rev. Alfred Daniel. The window has three lancet lights, the one being considerably longer than the others. In the upper medallion is portrayed the Ascension. Underneath it is a quatrefoil, in which are three angels. Under this is the principal figure, "The Good Shepherd"; and at the foot are interlaced triangles, as an emblem of the Holy Trinity. The left side light has three medallions—that at the top representing the call of St. Matthew; at the foot, St. Mark writing his Gospel from the dictation of St. Peter; and the centre comprising two large figures, viz., the Evangelists St. Matthew and St. Mark. The right side light has also three medallions, the upper one being St. Paul in prison being visited by St. Luke; that in the centre having two large figures of the Evangelists St. Luke and St. John; and the medallion at the foot depicting the call of St. John.

Coates.—A stained-glass east window, by Messrs. Lavers, Barraud, & Westlake, together with a handsome reredos, in mosaic and painted tiles, by Messrs. Powell, have just been erected in Coates Church. A memorial window to two of his children has also been erected for Mr. A. Cator, by Messrs. Lavers & Co.; and Messrs. Clayton & Bell have in progress still another window for the church.

Beaulieu. — Recent additions to Beaulieu Church, Hants, include a stained-glass window, by Heaton, Butler, & Bayne, in memory of the infant son of Lord and Lady H. Scott; a reredos of mosaic work, in glass, by Messrs. Powell; the new pavement of the sanctuary, with tiles which are copied (by Minton) from original Beaulieu Abbey tiles; and some gas-standards, by Messrs. Hart, Son, & Peard, those in the sanctuary and chancel being of polished brass.

Southdean Church, Scotland.—There have just been put up in this church a series of stained-glass windows. There are fifteen lights, all, with one exception, supplied by Messrs. Ballantine, Edinburgh, who fitted up the whole. In the north gable are two lofty lancets, with canopy designs; one, the gift of the Earl and Countess of Home, shows a full-sized figure of Moses, and the family arms below; the other, erected by tenantry of the Jedforest estate, in memory of the late Lord Douglas and family, presents Joshua in armour and royal robe, with the Douglas arms below. There are two canopy windows in the side. One of these has been erected by subscription, in memory of Thomson, the poet of "The Seasons." The Scripture subject is David as shepherd tuning his youthful lyre, and beneath is a likeness of the poet, as a young man, copied from an authentic portrait. The only other canopy subject is erected by Sir W. Elliot, Wolflee, in memory of his son. This has been executed by Mr. J. H. Baguley, Newcastle, and contains a representation of Christ stilling the waves.

Hamilton Parish Church.—Mr. James Stevenson, Hamilton, has just caused to be placed in the old parish church a memorial window, in memory of his deceased wife. The subject chosen is that of Mary at the feet of our Lord, with Martha standing by. The full text from Luke x. 41, 42, is given in ancient characters round the margin,—"Martha, Martha, thou art careful and troubled about many things; but one thing is needful, and Mary hath chosen that good part, which shall not be taken away from her." Messrs. Ballantine are the artists.

Plymouth.—A stained-glass window has just been erected in the Plymouth Guildhall, representing the ceremony of opening the Guildhall by H. R. H. the Prince of Wales, Lord High Steward of the Borough, in August, 1874. The Prince is represented receiving the key of the building from the then Mayor (the late Mr. Rooker), and on either side are officers and others who were present on the occasion. The window is the gift of Mr. F. W. Gibbs, C.B., and was executed by Messrs. Heaton, Butler, & Bayne, from the design of Mr. J. Milner Allen.

Books Received.

The Englishman's Illustrated Guide Book to the United States and Canada, especially adapted to the Use of British Tourists and Settlers visiting those Countries, with full Information as to the best Routes of Travel, most Attractive Scenery. Third Edition. London: Longmans, Green, Reader, & Dyer. 1876.

SUCH of our readers as contemplate a run to the States may usefully fortify themselves by the study of this little (illustrated) volume. Some who take it up without any intention of that kind will probably make up their mind to go the first opportunity. An appendix includes an account of the buildings and grounds of the International Exhibition at Philadelphia.

Experiments on the Strength of Cement, chiefly in reference to the Portland Cement used in the Southern Main Drainage Works. By JOHN GRANT, M. Inst., C.E. London: E. & F. N. Spon, Charing-cross.

IN reply to some inquiries for information as to Portland cement, we cannot do better than mention that a new edition of Mr. Grant's book was published at the end of last year. Mr. Grant had excellent opportunities for investigation in connexion with the main drainage works, and made that good use of them which might have been expected from his known intelligence and skill. The bulk of the book was originally read at meetings of the Institution of Civil Engineers, and reports are given of the discussions which followed.

VARIORUM.

THE *Penn Monthly* for July contains a paper by E. Wrigley on "The Advantages of the Co-operative Feature of the Building Association, compared with other Plans of Saving." This is the last sentence of the article:—"A community of patient, diligent, frugal, and contented workers, recognising fully the power and the beauty of co-operative effort, are like an army of road-builders—they improve the barren places of the earth, and make them to bloom as the rose. In place of wasting their hours in empty repining, and their strength in useless opposition; instead of listening to the idle talk and empty theories of the 'poisoner' and demagogue, they unite, not for the purpose of overthrowing capital, but with the design of becoming in good time capitalists themselves. Thus my text points the way, and co-operation applies the means, of creating that almost millennial state of existence for the working classes which has been the dream of the reformer since civilisation first dawned upon the earth."——A writer in the *Manchester Critic*, commenting on "Queer Inventions," says, speaking of perpetual motion:—"The oddest thing about these perpetual-motion inventors is that they are fully aware of their ignorance of mechanics, and lament that 'their people' did not put them to the mechanical business. Their failures and the want of success of their inventions are all due to bad workmanship and ignorance, and they know it. 'But if my father had only made me an engineer!' they sigh. If you are a good-natured man, and have a little time at the moment, you endeavour to go through the alphabet of force, and try hopelessly to refute and disenchant this man, whose wife tells you he is 'wasting his brains away with thinking, drat 'em!' This requires great care, and after you have prepared his mind by asking him if he believes, as a Christian man, that there are sixteen ounces in the pound, and if he ever knew any pound to have seventeen ounces, you craftily ask him if he knows of a weight lighter than sixteen ounces that will balance a pound in the scales. He cuts short your endeavours by quoting from a poet you have never heard of, and of whom you have no desire to hear:—

> 'A few rude methods,
> And some rough rules have wrought
> More for mankind
> Than all the pride of intellect and thought.'"

——"Up the River from Westminster to Windsor" (Hardwicke & Bogue) is a well-illustrated *brochure* and pleasant reading; it gives, however, but the briefest introduction to the places named. ——Speaking of the architectural drawings at "The Centennial," the *American Architect* says:—"The three influences, English, French, and German, to which we owe our architecture, are pretty clearly shown and distinguished in the Exhibition; and their local distribution is somewhat significant. The English influence, represented by modern Gothic of the Victorian type, predominates in the Boston work, and is very prominent in that of New York. The French influence is stronger in the New York section than elsewhere, though it leaves some trace also on the Boston and other Eastern work. The German influence is most marked in the Western work, just as we know that in fact the Germans are a more prominent element in the Western than in the Eastern communities. In the New York work we find the English, French, and German tendencies shown more on an equality than in any of the other, as the make-up of the city is more cosmopolitan in all respects than that of any other part of the country. In the Philadelphia contributions, the German element is prominent also, as it is in the city; but the representation is so incomplete that it cannot be taken as an index of what is done in the city. It is to be remembered, in taking into account the influences which act upon American architecture, that the work which bears a German character is almost exclusively the work of Germans. German architects come here already educated, as German mechanics do, and practise in the German way; but Americans who become architects acquire very little of the German habit in design. If they go abroad to study, it is almost invariably to Paris or London,—commonly the former, almost never to a German city. If they study at home, it is commonly with Americans of French or English tendencies, seldom of German. Hence, as native architects come more and more into majority, and the proportion of imported ones grows smaller, it is likely that the effect of German training on our building will diminish, and the English and French influences have the field more and more to themselves, till some distinctly American character asserts itself; which seems not likely to be the case very quickly."——The Report of the Leicester Free Library shows that the present number of books in the library is 15,073,—in the lending department, 11,012, and in the reference, 4,063,—being an increase, since the commencement, of 5,900. In the lending library the circulation has been 106,237, being an increase of 993; the purchases, 412 volumes, 333 having been to replace worn-out books. In the reference department, 7,174 volumes have been issued, being an increase of 345 on the previous year. 92 volumes have been purchased, and 185 presented.——The July number of *The Quarterly* is a good one. The articles on "Ornamental and Useful Tree Planting," "The Orkneys and Rude Stone Monuments," and "South Sea Island Mythology," will commend themselves to a large proportion of our readers. The writer of the article on rude stone monuments will not accept Mr. Fergusson's theory, which would deprive them of any extreme antiquity.

Miscellanea.

Technical Education in Germany.—The programme for 1876-77 of the Technikum Mittweida has just been issued. Mittweida is conveniently and centrally situated, being half an hour's journey from Chemnitz, three from Dresden and Leipzig, two from Freiberg and Zwickau, and five from Berlin. The teaching staff consists of the director, professors of mathematics, mechanical engineers, teachers of languages and commercial matters, and assistants. The chief advantage of the Technikum, as compared with the School of Science, appears to be that in the former greater attention is paid to the arrangement of the classes in such a manner that no student is compelled to learn the higher branches of any given subject unless he is likely to require it in the particular branch of industry to which he proposes to devote himself in after life. By this means each is enabled to obtain more than usual of the particular kind of knowledge useful to him, although he may get a little less general scientific knowledge than might be acquired in the School of Science.

Supposed Romano-Celtic Remains in Oxford.—Mr. G. A. Rowell, in a letter to the *Oxford Journal*, says that during the recent drainage works in Titmouse-lane (leading from the Canal Wharf to the Old Castle) several iron horse-shoes of a peculiar form were found at about 15 ft. below the surface. One, from a sort of clay not far from the castle, is bronze-like in appearance, and, although somewhat worn, as bright as if just made; the others were from a mixed soil, and are more or less incrusted with it, but there is not a speck of rust on any of them, although it is probable they had been underground from Romano-British times. From Fleming's work on "Horse-shoes and Horse-shoeing," it appears that neither the Greeks nor the Romans, until a century or two after the Christian era, shod their horses with metal, or, at least, with such shoes as were nailed to the feet; but that horse-shoes similar to those now in question have been found, with the well-known Celt and other bronze articles, in Celtic and Gaulic graves on the Continent and in Great Britain, all such horse-shoes being small in size and similar in form, showing that the horses of these regions in those days were diminutive as compared with those generally of later times. The quality of the iron of one shoe has been tested by Mr. Neill, of Corn Market-street, who states that it is of the very best quality, and such as it would be difficult or hardly possible to procure in the metal market. The shoes (with a hoof-picker found with them, and in a similar condition) will be deposited in the Ashmolean Museum.

Street Architecture in Elgin.—We learn from the *Elgin Courant* that the eastward part of Dr. Mackay's property, beside the British Linen Company's Bank—to which is attached the well-known tower which no tourist wishful to see the lions of the old city passes by without inspection—has been dismantled. The tower is attached to the south-east extremity of the property, and its walls contain, in three different parts, the arms of the Leslies of Rothes, with date 1634, and the letters A. L., believed to be the initials of Andrew Leslie, who was, at that time, one of the magistrates of Elgin, and who purchased the estate of the Glen of Rothes. We are glad to learn that the old tower is to stand just as it is, and the new erection contiguous to it, and of which it will form a part, will be entirely in keeping with it, and in the Scottish Baronial style. Billings, in his "Baronial and Ecclesiastical Architecture of Scotland," makes the tower the subject of one of his engravings. The new building is to be three stories in height, with a shop on the ground-floor. The entrance to the new dwelling-house will be by the present door of the tower. The contractors are:—A Robertson, mason; A. Munro & Son, carpenters; J. Wilson, slater; J. Hunter, plumber; David Simpson, plasterer; John Kintrae, painter and glazier.

Fine Art Gallery and Industrial Museum for York.—Arrangements are in progress for the establishment at York of a permanent Fine Art Gallery and Industrial Exhibition or Museum. All the preliminaries are now said to be settled, and the future of the project is cheering. A large guarantee fund, amounting to upwards of 30,000*l.*, has been arranged, and the call of 20 per cent. on the guarantors is being promptly paid into the bank. At a meeting of the Executive Committee, on the 7th inst., Sir James Meek in the chair, Mr. Taylor, architect, presented a lithographed block plan, with elevation of the proposed permanent building. It is designed for the reception and display of paintings, sculptures, and other works of art, with accommodation for a technical museum. Negotiations have been concluded with the Commissioners of Woods and Forests for the acquisition of the site known as Bearpark's Gardens, and the meeting resolved that a cheque for 4,000*l.* be drawn to complete the purchase of the land and to obtain the grant from the Crown. A house adjoining the site has been purchased for 600*l.*, and the executive are now in possession of the whole of the property required.

Building Societies and Sanitary Associations.—Under cover of the interest which has been evoked with reference to improved habitations, various societies are being formed and projected. We will simply advise our readers at present that before taking shares in such schemes or otherwise joining any one of them they should satisfy themselves that trustworthy persons have the management of the undertaking.

Impure Ice.—The mixing of ice with light wines and other summer drinks has now become so general amongst the better classes of society, that some assurance of its purity seems necessary. What is termed Wenham Lake Ice is principally imported from Norway in large blocks cut out from the frozen fiords or lakes, the water in which is usually very pure, but owing probably to the annually increasing demand for this luxury, a large quantity of ice, apparently clear and transparent, is sold, which does not come from any such unobjectionable sources, and which, when melted, might fairly merit the designation of "dirty water." Dr. Whitmore, in his report on Marylebone, says,—"Some of this melted ice has been brought under my notice, in which I found a considerable amount of sediment, apparently of vegetable matter. Those who use ice are recommended to test its purity by dissolving a small portion in a wine-glass, and if the water is clear and bright, in all probability it is genuine Norway ice; but, if otherwise, it should be rejected." This warning is very necessary.

Proposed Winter Gardens for Leamington.—A public meeting was held at Leamington on the 13th inst., to consider the desirability of establishing winter gardens in that town. The mayor expressed his sympathy with the scheme, and his best wishes for its realisation. He then introduced Mr. Hyde, of Southport, who constructed the winter gardens in that place. That gentleman detailed his proposals, pointed out the success of the Southport Winter Gardens, and the great benefits which had accrued to the place through the establishment of such a resort, and showed that similar results might be expected to follow the provision of similar attractions in Leamington. On the proposition of Alderman Bright, seconded by Councillor Salmon, it was resolved that it was desirable to establish winter gardens in Leamington. A provisional committee was appointed to consider the scheme, which it is proposed to carry out by the formation of a limited liability company. Three sites are mentioned.

Newnham Paddox, Lutterworth.—The Earl of Denbigh is making great alterations to his mansion and grounds at Newnham Paddox. The north wing has been pulled down, and a new wing, 120 ft. long, three stories high, and containing seventeen suites of rooms, is to be erected. There will be a tower in the centre, and the whole will be built of brick, with stone dressings. The alterations are being carried out by Mr. J. Bromwich, builder, Rugby, from designs by Mr. T. H. Wyatt, architect. On the 11th inst., the Countess of Denbigh laid the foundation-stone of the new building. A portico is to be built over the iron gates that are to be removed from his lordship's Berwick estates. The gates will, it is supposed, cost about 1,000*l.* to remove to Newnham.

Glass from Slag.—At the quarterly meeting of the North of England Iron and Coal Trade, slag was shown in a fibrous form, and in the Barrow district a company is in process of formation to manufacture slag into glass, under a patent taken out by Mr. B. Britten. The slag is taken as issuing from the blast-furnaces, conducted into a tank, and there mixed with other materials, from which mixture transparent glass is made. It is claimed for the new glass that it is acid proof, and capable of use for all purposes for which the best bottle glass is suitable. Experiments have just been conducted at the Wellingborough Ironworks, and it is claimed that the saving in the process is so great that it is likely to bring about important changes in the glass manufacture.

The Birmingham Improvement Scheme. All the petitions against the scheme of Alderman Chamberlain, M.P., for the improvement of Birmingham, under the Artisans' Dwellings Act, have been withdrawn, and consequently there will be no opposition to the Bill in the House of Lords. The scheme will involve the purchase of property valued at nearly two millions sterling, and have the effect of sweeping away a very large portion of the slums and unhealthy dwellings in the town.

Bricklayers.—We are asked to say that technical classes for the instruction of bricklayers are now being held at the Artisans' Institute, St. Martin's-lane, being the result of the recent meetings held with the view of improving the condition of the trade, and that over thirty students have already joined. An architect is announced as president.

Sanitary Institute of Great Britain.—The Duke of Northumberland presided, on the 13th inst., at a large meeting convened in St. James's Hall, for the purpose of forming a society to be called the Sanitary Institution of Great Britain. The object of the proposed institute will be to direct public attention to all matters affecting public health. It will watch all measures introduced into Parliament relating to public health and sanitary reform, and it is intended to form branches in urban and rural sanitary districts in connexion with the central office in London. Are there not existing organisations which could be made to effect this?

New Skating Rink at Stafford.—A skating rink for Stafford, situate in the Newport-road, was opened on the 5th inst. The rink is a covered one, and is 165 ft. long and 56 ft. broad, excluding the offices. The gable ends are of brick and stone, while the sides and offices are of wood, with brick piers. The roof, which is supported with iron ties and rods, is lofty, and, together with the sides, is picked out in colours of various tints. The skating surface, which has been laid by the Val de Travers Company, contains 8,250 square feet. There is also a spacious promenade, a raised platform at one end, and a band-stand. The rink has been erected by Messrs. Hayes & Son, under the superintendence of Mr. W. F. Bagnall, architect.

Foreign Competition.—During the last few months, says the *Birmingham Post*, a French manufacturing firm has established an agency in Birmingham, and has supplied large quantities of hardware peculiar to Birmingham and its district, at prices considerably lower than those of native manufactures, such articles being, nevertheless, frequently made from Staffordshire iron and Sheffield steel. Another significant hint as to future competition, not only in foreign and colonial markets, but even on English soil, is the lists of prices of several American manufacturers who are supplying not only axes and steel forks, for which they have long been famous, but a great variety of hardware goods.

Accident to a "Steeple Jack."—On the 13th inst. an accident occurred to a man named William Woodruff, who is one of the men known by the nickname of "Steeple Jack." For some time past the chimney-shaft belonging to the Bone Grinding and Dust Company, Bromley-common, has been leaning, and the services of Woodruff were called in. He ascended for the purpose of sawing the shaft, and labourers were attaching a second sling, when a stone fell from the top of the chimney, striking Woodruff and smashing both thighs. The sling was then lowered, and the injured man was taken to the hospital, where amputation of the left leg was deemed imperative.

Proposed Tower Bridge.—At a public meeting held at the Vestry Hall, Minories, on the 10th of July, it was resolved,—"That this meeting having heard a description of Barnett's Patent for a bridge across the river Thames, from the Tower to Rotherhithe, explained by Mr. Le Fevre, hereby expresses an opinion that it is worthy of the consideration of the Bridge Committee of the Common Council, and that the site selected by the engineer is approved by this meeting." We are not able to persuade ourselves that the design will ever be carried out.

Proposed Public Buildings at Alnwick. Mr. F. R. Wilson has prepared three alternative plans for providing increased accommodation for Quarter Sessions business at Alnwick. The first plan provides a new court-house, extending from the town-hall to the corner of the Market-place. The second proposes to divide the Corn Exchange into courts and other necessary apartments by means of sound-proof partitions. The third plan is to provide the required accommodation by additions and alterations to the county premises in the Green Bat.

Swansea Master Builders' Association.—The members of this recently-formed association dined together on the 11th inst., when about thirty of the master builders of Swansea and one or two invited guests from Newport and Gloucester were present. Mr. Wm. Thomas (of the firm of Thomas, Watkins, and Jenkins), as the president of the association, took the chair, the vice-chairs being filled by Mr. Thos. White, vice-president of the Society, and Mr. Thomas Rees. Mr. William Williams, of Newport, proposed the toast of the evening, "Success to the Master Builders' Association of Swansea."

Matheson and Grant's Engineering Trades Report says,—"The iron and other staple trades of the kingdom which depend upon engineering enterprise for their prosperity afford at present the most conspicuous examples of the general commercial depression which has now prevailed in England for more than a year. The causes of this depression are various; but most of them are but incidents in the general reaction which is still taking place from the over-trading and speculation of 1871-2 after the close of the Franco-German war."

The New Edinburgh Infirmary Buildings.—At a recent meeting of the managers of the Royal Infirmary, Mr. John Bryce was appointed architect to the new infirmary buildings. In making this appointment the managers have had regard to Mr. Bryce's intimate acquaintance with the plans, in the preparation of which he took an active part, as well as to his knowledge of the late architect's intentions in regard to the completion of the buildings.

Gloucestershire Archæological Association.—The first annual meeting of this Association will be held at Gloucester on Wednesday, Thursday, and Friday, the 23rd, 24th, and 25th of August. The first day of the meeting will be occupied in visiting the cathedral and other ancient buildings in Gloucester, under the guidance of Mr. John Bellows. On the following day the Association will visit Tewkesbury and Deerhurst; and on the Friday Berkeley Castle will be inspected.

Great Eastern Railway.—The improvements which have been in progress at Stepney Station several months, and which were noticed by us recently, have been brought to a successful completion, and the passenger traffic which it was found necessary to suspend during the execution of the works, was resumed on Monday the 17th inst.

New Lunatic Asylum at Portsmouth.—A new lunatic asylum for the borough of Portsmouth, at Milton, has been in course of construction for several months past, and on the 11th inst. the ceremony of laying the foundation stone was performed. The builder is Mr. C. T. Quick, and the architect Mr. George Cake.

Death of the Borough Surveyor of Shrewsbury.—The death is announced of Mr. Thomas Tisdale, borough surveyor of Shrewsbury for the past quarter of a century. The Mayor, in moving a vote of condolence with the family, paid a high tribute to Mr. Tisdale's zeal and ability.

Drawings at the American Exhibition. Information reaches us that many of the drawings now in the Exhibition at Philadelphia are being much injured by the absorption of moisture. Who is looking after the English pictures there?

Surrey Archæological Society. — The annual excursion, under the presidency of Viscount Midleton, is fixed to take place on Thursday, the 3rd of August next, to Godalming, Thursley, Elstead, and Peperharow.

TENDERS

For banking premises and manager's house, Batley, for the West Riding Union Banking Company. Messrs. Sheard & Hanstock, architects. Quantities by the architects:—

Brier, Sons, & Wilson (masons, &c.)	£4,950 0 0
Thorpe (joiner)	1,649 15 0
Armitage (plumber)	444 7 6
Bagshaw & Son (ironfounders)	320 0 0
Rawsthorne (slater)	182 15 0
Kitchingman (plasterer)	150 0 0

For a semi-detached residence in The Avenue, Acre-lane, Brixton, for Mr. Henry Dann. Mr. W. H. Harding, architect:—

Crew (accepted)	£375 0 0

For sundry alterations to Church-road Wesleyan Schools, Homerton:—

Jarvis & Sons (accepted)	£545 0 0

For offices, Sugar Loaf-court, Leadenhall-street. Mr. Robert J. Worley, architect:—

Rudkin (accepted)	£1,215 0 0

For house and shop for Mr. Welch, Limehouse. Messrs. A. & C. Harston, architects:—

Hearle	£595 0 0
Walker	485 0 0
Salt	483 0 0
Johnson	479 0 0
Reed	470 0 0
Harris & Wardrop (accepted)	445 0 0

For enlarging premises at 19, Great Marlborough-street, for Messrs. Small, Brothers. Mr. A. W. Galbraith, architect:—

Allen	£420 0 0
Ryder (accepted)	410 0 0

For West Ham Union Schools, dormitories, and offices. Mr. Lewis Angell, architect. Quantities by Mr. T. Nixon:—

		Extra Block.
Judd & Hawkins	£20,436	£1,800
Rivett	20,385	2,089
Shurmur	19,586	2,117
Aitchison & Walker	18,455	1,785
Nightingale	18,287	1,882
Linfield	18,250	1,730
Sheffield	17,968	1,876
Morter	17,777	1,758
Langmead & Way	17,770	1,750
Stephenson	17,430	1,717
Eunor (accepted)	17,284	1,791

For execution of drainage works, &c., at Twyford, Winchester, for the Rural Sanitary Authority of the Winchester Union. Mr. A. W. Galbraith, surveyor:—

Clark	£1,321 11 9½
Cowdery & Sons	752 0 0
Allen	685 0 0
Croxford & Co.	681 11 0
Sibsey (accepted)	606 18 2
Egerton (sum total not given).	

For labour only to dwelling-house, Mapperley Plains, Nottingham. Mr. T. G. Alderson, architect:—

Lewin & Carter	£283 0 0
Binks & Knowles	227 14 5
Parnall, Brothers (accepted)	225 0 0

For erecting new music-hall and altering billiard-room, &c., at Three Cups, Bow, for Mr. Prideaux. Mr. James Broadhurst, architect:—

J. & H. Cocks (accepted)	£2,100 0 0

For formation of new roads on the Culverden Park estate, Tunbridge Wells, for Sir David Salomons, bart. (first portion). Messrs. Lander & Bedells, surveyors:—

Woodham, Brothers	£625 0 0
Skinner & Co.	548 0 0
Goldsmith	527 3 6
Hawkes	506 0 0
Perigoe	492 19 3

For ten blocks of buildings at North Hill, Highgate, for the Directors of the Highgate Dwellings Company. Mr. W. Ward Lee, architect. Quantities not supplied:—

Brown	£7,670 0 0
Southgate	7,514 0 0
Smale	6,989 0 0
Wheeler (withdrawn)	5,750 0 0

For new Congregational Church, Romford, Essex, in accordance with amended drawings. Mr. E. C. Allam, architect:—

Staines & Son (accepted)	£3,210 0 0

For alterations and additions to the Burlington School, Burlington-street. Mr. J. T. Wimperis, architect:—

Holland & Hannen	£5,350 0 0
Smith & Co.	5,300 0 0
H. & A. Bywaters	5,199 0 0
Scrivener & White	5,110 0 0
Patrick & Son (accepted)	5,045 0 0

For house at Hendon, Middlesex, for Mr. William Goode. Mr. J. T. Wimperis, architect:—

Fish	£4,103 0 0
Lawrence & Sons	3,982 0 0
Patrick & Son	3,824 0 0
Brass	3,697 0 0

For new wing, &c., to the Royal Free Hospital, Gray's-inn-road. Mr. William Harvey, architect. Quantities by Mr. Henry Smith:—

		Deduct for Bath Stone.
Eborall	£14,040	£750
Dove, Brothers	13,735	390
Smith & Co.	13,360	400
Hill, Higgs, & Co.	12,990	450
Kirk & Randall	12,876	490
Shepherd	12,450	485

For a pair of semi-detached residences at Walthamstow, Essex. Mr. Robert Blackmore, architect:—

Bullen	£1,030 0 0
Larter	990 0 0
Tubby (accepted, subject to alteration)	847 0 0
Luxford	805 0 0
Crabb	650 0 0

For bailiff's house and cottage at Kingswood, for Sir John Hartopp, bart. Mr. William Smith, architect:—

Keal (accepted)	£1,315 0 0

For rebuilding Poulstone Court, Fawley, near Ross, for Mr. R. Jones. Mr. H. Carr, architect. Quantities by Mr. George Hackford:—

Pearson	£5,195 0 0
Stephenson	5,018 0 0
Woodbridge	5,000 0 0
Welch	4,998 0 0
Everal	4,983 0 0
Stephens & Bastow (accepted)	4,974 0 0

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We are compelled to decline pointing out books and giving addresses.

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